ELECTRICAL WEST

WITH WHICH IS CONSOLIDATED THE JOURNAL OF ELECTRICITY

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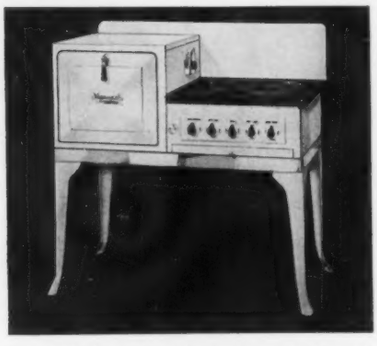

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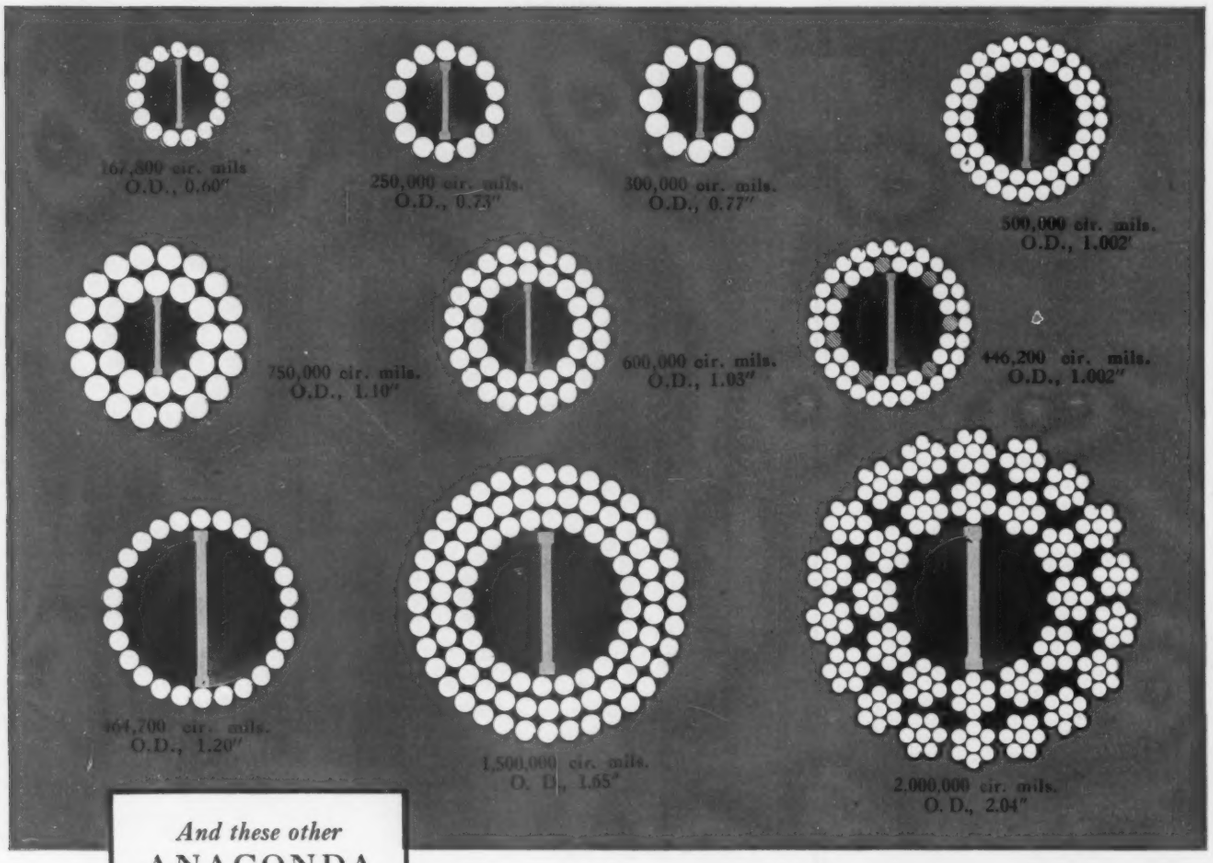
Typical cross sections of Anaconda Hollow Conductors, designed to meet different sets of conditions



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ELECTRICAL WEST

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San Francisco, June 1, 1932

Volume 68
Number 7

G. C. TENNEY, *Editor*

LOS ANGELES' mayor again joins together that which not man but a commission put asunder. Strengthened by the failure of a municipal-ownership-inspired recall against him, he even demands the resignation, nay fires, two commissioner backbones of city-owned power.

▼

LAMP companies step down from the Mazda pedestal to stem the tide of foreign tencent invasion. Chain stores are the battlefront. Old regulars have no relish for this new-fangled warfare.

▼

LIKE Brawley, Calif., Salem, Ore., received no bids for a bond-pledged diesel plant. Something may be wrong with the fiscal perpetual motion theory that such projects pay for themselves out of savings.

▼

IF words were bricks, "government ownership" would be completely buried under the avalanche of essays and speeches in this year's contests.

▼

AS with the golfing businessman of 1929, electric distribution systems of that day often wasted energy on non-essentials—transformer and line losses. Loss studies help to put each kilowatt back to work for its board.

▼

A glittering generality — "everyone's self-interest" — broken down to specific details on a large apartment house reveals the slogan more truth than poetry.

The Month

ELECTRICAL expositions are the new day band wagon. Some parades are great business thrillers, but in others sometimes the show is stolen from the main tent attractions by a caliope.

▼

REWIRING and all its implications of business revival depends upon a simple statement kept constantly on the lips of everyone in the industry, a verbal barrage to break down the barbed wire of indifference.

▼

SEATTLE'S accountant denies high tax coincidence; a fisheries engineer unshocks a fish story; a purchaser calls for price courage; and an unemployed worker writes the industry's great challenge—in letters published in this issue.

▼

UTILITIES of the West, editors find, still face dealer legislative reprisals, even initiative petitions on the November ballot, despite the Oklahoma and Kansas failures in appliance prohibition. A municipality starts a new dealer plan with liberal features.

Editorial

An Engineering Organization —Model 1932

UNDENIABLY this is a period of change, of reorganization, of adjustment, in the effort of all industries, including the electrical, to orient themselves to shifting economic conditions. Today, corporate existence often rests solely on the ability to adapt itself successfully to these new demands and, in the struggle to keep the ship afloat, organizations are jettisoned, sailing directions cast overside, and even indispensable auxiliaries are sunk in the sea of depression in hopes that the light load will insure arrival at the harbor of economic security. Few consider the cost of re-outfitting for future voyages.

Such desperate measures are both unnecessary and unwise in many instances. Take, for example, the asset of a competent and well-trained engineering organization in any large power company. Three years ago the engineering department could be likened to a high-powered, racing, stream-line automobile rapidly carrying industry to new achievements. As with individuals, when faced with the prospect of curtailed income, the tendency is to sell the car and get along without it until the future seems assured. Rather than take this drastic step, many companies have found it advisable to trade the old car in on a new model, a model more suitable for the rough going which confronts industry today.

Previous to 1930, engineering departments of electric utilities chiefly were concerned with keeping ahead of an ever-increasing demand for kilowatt-hours. For the time being, generating capacity has caught up with production demands, and in the breathing spell thus provided there is time for a thorough review of system growth.

Here is an opportunity to justify traditional methods and practices, to study system design for a reduction in losses, to effect more efficient operating schedules, to investigate obsolescence of equipment in the light of improved design of apparatus, and to establish more rigid maintenance and service policies conforming with the ever-increasing standards of customer satisfaction. Here is the opportunity to correlate engineering and sales departments, to find the cost of adding new load, to evaluate costs of serving new loads with sales expense, to evolve low-cost distribution systems for reaching customers now inaccessible and thereby broaden the field of prospective consumers.

Countless problems demanding engineering skill confront the electrical industry today. Companies which now operate 1932 model engineering departments already are reaping benefits in reduced losses, increased economies, and unimpaired net returns on their investment. And when the tide turns, this new model will be set to carry on again the construction programs that will be needed to serve the growing use of electric service.

Prosperity Sometimes Proves a Boomerang

AS earning reports of some utility companies make their appearance for the first quarter of 1932 and show increased net earnings over the same period of 1931, one is reminded of the statements of a popular economic and financial writer in an article last year. Commenting on this possibility, he warned, "It would be courting trouble to wear a new top hat and morning coat in a bread line, or diamonds in a flop house."

While it is true that these earnings statements reflect certain credit upon management and invoke praise from the investor, at the same time they appear to an innocent bystander as an invitation for criticism and attack. Already the public, led by certain politicians, is beginning to doubt the effectiveness of regulation which will permit such records when most other businesses report no profits at all or show deficits. Rate decreases are being demanded under threat of substitution of other forms of power such as diesel or gas engines or, even worse, municipal ownership.

Even the industry has a right to criticize when it knows that some of these favorable earnings statements have back of them reduced personnel, wage cuts, curtailment of normal and necessary extensions, postponement of maintenance, reduction of commercial activities and appropriations and various and sundry other retrenchments.

Equally open to criticism are those holding companies which restrict operating companies to similar programs so that common stock dividends may be paid.

Under such circumstances it appears to ELECTRICAL WEST that good public relations and good industry relations would warrant a sharing of some of this prosperity in voluntary rate reductions, in reasonable construction programs and in increased market development activities.

Otherwise, distrust, antagonism and resentment may force an indignant public to take matters in its own hands with dire consequences to the utilities.

Price Competition and Lighting Standards

IS the electrical industry to be cheapened by the threat of foreign and domestic competition in off-standard lamps? Aroused by the inroads of "ten-cent" competition, the large lamp companies have countered with a ten-cent standard lamp possessing most of the characteristics of the Mazda except for a 500-hr. life instead of 750 or 1,000 hours.

Price competition frequently brings out weaknesses not hitherto suspected in marketing. In this case it appears that the general public has not yet been educated to place a price premium on quality of lamps. If the average purchaser ever thought of life, energy consumption, lumen output or efficiency, the "ten-centers" would not have proved the threat which they have become. Which prompts the repeating of questions which this latest development has raised in the minds of many people in the industry.

What is to be the future of high quality Mazda lamps and of the lighting standards which have been so laboriously built up? What will be the effect on the established electrical dealer who cannot hope to compete with the chain store outlets which fostered this competition, either in volume of sales or on the reduced margin which the new ten-cent lamp offers? Is the resulting competitive situation within the ranks of the industry between high quality and low price the logical answer?

Might not a cooperative program involving the manufacturers, the utilities and the legitimate electrical dealers to show the public what the industry already knows, namely, that the sale of an off-standard lamp should include a one-dollar bill to pay the purchaser for his folly, have been better for both industry and consumer? ELECTRICAL WEST thinks so.

"Slow" Electric Ranges Can Be Made Fast

"BUT the electric range is so slow!" Range salesmen and, for that matter, all individuals in the industry who advocate electric cookery, have met with this argument. The industry knows that the charge, whether founded on prejudice, hearsay, imagination, or plain lack of interest, is baseless. Tests have proved that units on the modern electric range will compete with any other fuel in the matter of time for performing a cooking operation.

But what of the thousands of electric ranges five, six or even ten or more years old that are on the lines of power companies on the Pacific Coast that have been in the range business that length of time? In comparison with modern cooking devices, particularly modern electric ranges, they do lack speed although they give the housewife all of the other advantages associated with electric cookery. Because of this unfavorable comparison in the matter of speed they constitute a potential menace to the success of the industry's cooperative program to sell a million electric ranges.

To correct this condition ELECTRICAL WEST believes that real effort put behind a campaign to replace surface units on these old ranges with modern high-speed units would have far-reaching effect in furthering public acceptance of the electric range. Every range now in use equipped with "slow" units is a distinct deterrent to the cause of electric cookery. The industry cannot afford to have a single housewife spreading the news to her neighbors that her electric range is slow. Power companies and manufacturers cooperatively can correct the condition in short order and at a cost not too great when the market for a million ranges stands in jeopardy.

What Is Depreciation?

WHAT is reserve for depreciation? Is it camouflage to conceal profits from the income tax collector? Is it a reserve for liquidation? Or is it what the name implies: a provision for proper and necessary funds to be expended each year so that manufacturing plant or electric system or power house may be maintained at equal or improved efficiency?

Admitting that this is no time for expansion except to meet new demands, there is equally no excuse for allowing plant and equipment to deteriorate seriously and that, according to evidence, is what is happening throughout the country.

Replacements during the past two years in industry and in utilities have been cut to a minimum. Maintenance work has been left undone. Were business tomorrow to make unusual demands for products or for service, some plants would break down and systems fail.

This is a plea for a rational basis of maintenance and replacement. Reserve for depreciation has been set up for these purposes. Judicious expenditure today with prices at the lowest levels in history will show that management is acting as the real custodian of stockholders' property.

Is Government in Business Contra To the Spirit of the Constitution?

By HOWARD A. SULLIVAN
San Joaquin Light & Power Corp., First Prize

Of the 3,137 Essays Entered in the P.C.E.A.'s Annual Contest, the Two Printed Here Were Judged the Best, and Both Find the Answer to Be: Yes

"In all that the people can individually do as well for themselves, government ought not to interfere."

ONE of the greatest immortals the world has known made that statement—a great president of the United States—Abraham Lincoln.

By voicing those few, carefully chosen words, the Great Emancipator re-echoed the thoughts embodied in the first written constitution in the history of man—the Constitution of the United States.

In perusing that famous document, together with the history of its adoption, one fact stands out above all others. The founders of our republic understood the springs of human action. They knew the motives that control the minds of men. Students of ancient and medieval history, knowing the history of the countries of Europe, they were familiar with the forces that had caused the rise and fall of empires.

The framers of our Constitution knew that there were but two methods of guiding a nation: one under a democracy, with individual initiative, ownership and management as its basis; the other by collective, or public, ownership and management.

Looking backward across the historic arches that span the centuries, the founders saw that from the beginning of time men had selfishly sought dominion and tyrannical power. They saw the lusts for increased power of men entrusted with public office. They knew what men had done before. They knew what had succeeded and what had failed. Their genius of statesmanship rose to its zenith when they framed the Constitution and breathed into it a living principle whose soul is vibrant with the largest measure of human liberty consistent with orderly government. The acknowledged principle of their handiwork was, and is, the right of every individual to liberty of person, liberty of property and liberty of contract.

In sanctioning the Constitution, the founders of our nation delegated to each citizen the right to carve out his own fortune with his own industry and skill; to choose any lawful occupation, calling or business and to follow the same honestly without molestation; to strive, to save, to accumulate and to own, use and manage lawfully acquired property and the profits thereof; to employ others, or to be employed by others, by mutual consent and agreement. From this sound principle, safeguarded by that Constitution, has grown our civilization and the greatest nation in the world.

Under our democracy, with its assurance of liberty of purpose, American individualism has founded and engineered enterprises which have freed the American people from the burdens endured through ages past and has elevated our nation to a pinnacle, to be gazed upon and envied by the world. Railroads, telephones, gas, electricity, street railways, automobiles—the greatest industries the world has known, all pioneered and fostered through nascency and adversity—not by government, not by bureaucracy—but by individuals.

Government is not, never has been, a builder or a seeker of new industry to aid its people. Morse, inventor of the telegraph, begged and pleaded with ten congresses without receiving attention, while necessity prompted the immortal Edison to install his first electric lights free in order to receive the needed recognition. Government was not interested. It laughed to scorn the ideas and efforts of its own citizens.

But success has crowned the efforts of the industrial pioneers. The opportunity for individual reward for individual accomplishment, recognized by our constitutional fathers as a necessity of progress and a corollary of free government, was the spur that drove them on. In a comparatively brief time, mighty industries have been built up. Existing as they do by sufferance of the people, they constantly strive to make of themselves better, more efficient, more ideal public servants. Industry recognized the inherent right of the people to the service it performs. The result is that America is by far the most progressive industrial nation.

Not the least of the difficulties encountered by the pioneers of industry and by those carrying on in their stead today, have been the repeated attacks of demagogues and politicians who, through selfish greed for personal gain or through misconceptions, would plunge the government into a business—after it has proved successful—in competition with its citizens. Their loud harangue and widespread gestures over a period of many years have been responsible for placing government in business, making of it an industrial octopus instead of an industrial protector. Today government is a speculator, investor, monopolist and competitor—also a regulator. It is in banking, shipping, printing, aviation, manufacturing, wheat, oil, power, coffee and other enterprises.

That federal, state and local governments are deeply rooted in business, fighting their own citizens in the quest for profit, paying no taxes, defraying losses from taxes levied on tax-burdened business, is clearly evident, not only in America, but throughout the world.

The way it has turned out is painful to behold. The four leading cities of the United States, not to speak of smaller cities, are bankrupt. The national government is so deep in the "red" that it may be centuries before it emerges from the abyss. Similarly, governments of other countries which were plunged into business by simple-minded politicians are discovering that they cannot pay the price. New Zealand bankrupt; Australia nearly so; Canada's cost of government increased a billion dollars in eight years, ascribed largely to government in business; Japan offering her telephones for sale; Italy selling hers; France anxious to find buyers for her

government railroads; Berlin selling her municipal electric properties; Great Britain steadily substituting private for public ownership of electric power plants.

Business, first or last, broadly speaking, pays those deficits incurred by governments. It is not strange, then, that level-headed business men are extremely careful about going ahead aggressively. Had our government adhered to the desires of our constitutional fathers, business today would be as aggressive as in the past.

The rich heritage of freedom handed down by our fathers, safeguarded by the Constitution, is threatened by self-seeking politicians who would tear down our citadel of freedom and over it raise a flag of bureaucracy and tyranny. It is for us, the living, to defend the ideals of our forefathers so that we, too, may bequeath to our successors the opportunity of freedom of achievement offered by our Constitution—unmarred by futile amendments—majestic in its entrenched simplicity.

By FRIEDA REDMAN
Southern California Edison Co. Ltd., Second Prize

THERE seems to be so strong a trend toward government management of business, not only in this country but the world over, that it is well worth while to note its direction. Russia is engaged in the greatest experiment of government ownership that has ever been attempted and much interest has been aroused in its progress. Practically every nation in the world is engaged in government ownership in one or more projects.

Government ownership means the replacement of individual or corporate ownership and direction of industry or business through government agencies, federal, state or municipal. It is government in competition with its own citizens.

There have always been people in this country, as in others, to urge that the federal government take over the railroads, the coal mines, the telegraph and other commercial projects. Certain movements toward public ownership are now gathering momentum in this country, particularly in the field of power. It is the claim of those who advocate this course that government will be able to function better or at lower cost than private enterprise.

For more than a century the people of this country have progressed and the nation has flourished under a structure of government which was neither planned nor equipped for the tasks of private business. Experience proves that governmental bodies are less economical and efficient than are private individuals conducting a business.

From 1916 to 1928, Australia operated the shipping industry, under Government ownership, at a loss of nearly eight million pounds sterling. In 1928, the shipping utility was returned to private ownership. In the United States and in Canada, as in Australia, shipping, as a direct governmental utility, has not proved a financial success.

Transportation, the Soviet papers of Russia say frankly, is in a deplorable state of disorganization. And on Dec. 27, 1931, heads of sully trusts were arrested for "unwarranted displays of mismanagement." It is thus evident that Communism is having trouble with its policy of complete governmental ownership.

England recently decided the question as to whether the railroads were to be operated under government ownership or private ownership. The decision was made in favor of private ownership.

In this country, we have the Muscle Shoals power project, now lying idle, after the government has expended over $127 millions in its development. This project will come up before the present Congress to decide whether the government will operate it or whether it shall be leased to private business.

Ex-President Coolidge stated before Congress in 1925 the following on this project: "If anything were needed to demonstrate the almost utter incapacity of the national government to deal directly with an industry and commercial problem, it has been provided by our experience with this property (Muscle Shoals). We have expended vast fortunes, we have taxed everybody, but we are unable to secure results which benefit anybody. This property ought to be transferred to private management under conditions which will dedicate it to the public purpose for which it was conceived."

Holyoke, Mass., which has municipal ownership of gas and electricity, claims the lowest gas and electric rates in Massachusetts. The mills in this city have to pay an exorbitant monthly flat rate for power that has seriously hindered these concerns. The average monthly domestic bills for gas and electricity are much higher than in its neighboring city, Northampton, which operates these utilties under private ownership.

A recent study of the rates for residential electricity in Minnesota showed that homes served by private electric companies paid smaller electric bills than homes served by politically operated municipal plants. This study was made by M. B. Lambie, secretary of the League of Minnesota Municipalities.

These few examples show that government ownership has not proved successful. One doen't have to look far to gather innumerable instances of government ownership proving to be less economical, inefficient, and costly to the taxpayers, whether national, state or municipal ownership. The leading men of the country have stated their opinions opposing government ownership, among whom we find President Hoover, ex-Presidents Taft, Wilson, Harding and Coolidge, Samuel Gompers, William Green, Gov. Ritchie of Maryland, and Roger Babson.

Today we find the Postoffice Department, which at one time handled only "mail," competing against the banks and express companies. The medical profession is beginning to campaign against the government's hospitalization plans for ex-service men which is beginning to cut into the doctors' and hospitals' existence. The national druggists' organization is beginning to battle for its local druggists to obtain government purchase of drugs in the communities where the government hospitals are located. The power companies are waging battles against government ownership of power, whether national, state or municipal. Public ownership opposition is being carried on by each individual industry as it is being attacked, but without much success.

To really quell the government ownership movement, it is necessary for private business to adopt different methods. It is time that business efficiency enters into an aggressive campaign that will enlighten the people of this country as to the true facts of governmental ownership failure. This can best be accomplished by a united organization of all industry and business that is being affected by government competition or will be affected. This organization should make an extensive survey of every phase of public ownership and then proceed to use every opportunity to place these facts before the public. This educating campaign should be carried on unceasingly, not only when a government ownership campaign is on. Publicity of every sort should be widely used. The fallacy of the commonly used "trust" argument should be revealed. All the individual members of this organization against government ownership should lend their support in every campaign and at all times. If this plan is followed and used with business efficiency and aggressive tactics, government ownership projects will soon be defeated and will not be factors of competition against private business.

Reducing System Losses With Efficiency and Load Duration Curves

By JOHN BANKUS
Electrical Engineer,
Portland General Electric Company

Illustrating How a Thorough Analysis of Equipment Losses May Be the Means of Effecting More Efficient Operating Schedules. Load Duration Curves Are Used to Determine More Effective Apparatus Combinations, Which Produce Savings Conservatively Estimated at One-half of One Per Cent of the System Input With no Capital Outlay

ECONOMICAL operation of power systems requires a careful consideration of system losses, and methods and practices which will hold losses to a minimum value. To do this it is particularly important to take full advantage of equipment which is already installed, a problem which has been given special attention by the management of a Northwest utility during the past year.

At the inception of this study, careful analyses of operating problems were made and results indicated that economies could be made by ascertaining the full possibilities of apparatus utilization in each step from generation to customers' meters Although a detailed account of the analysis of this system would be interesting, still more valuable is a description of the methods

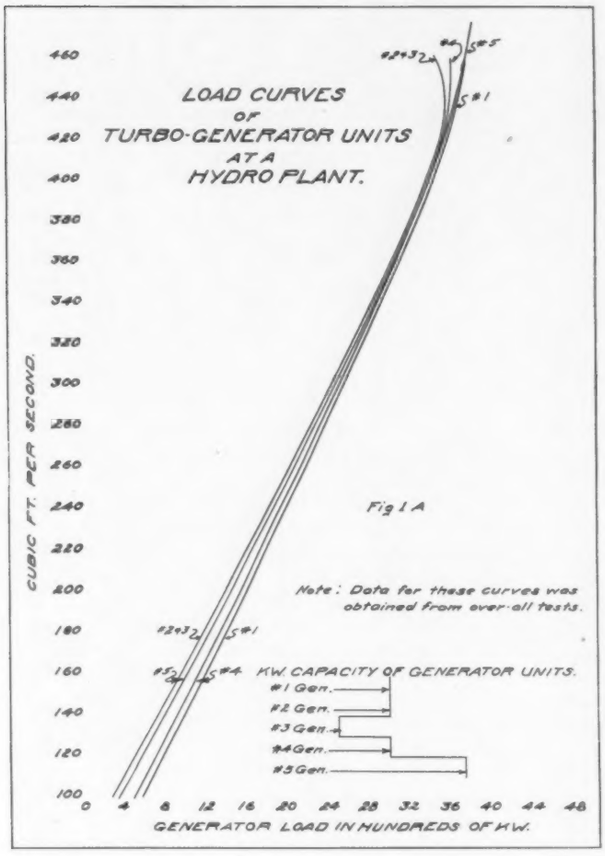
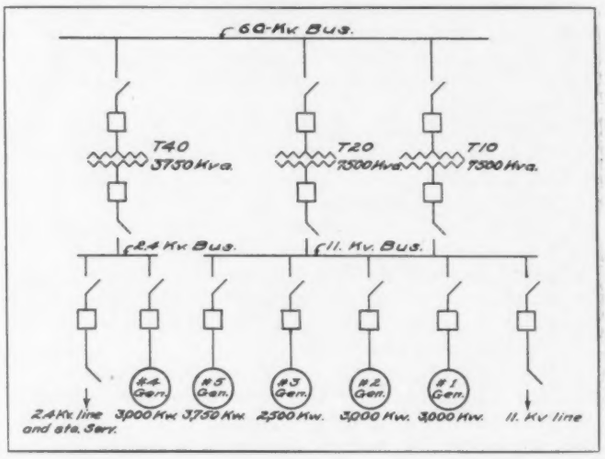


Fig. 1A—Load curves of station hydro-generator units

Fig.1B—One-line diagram of the station showing generator units and transformer banks for which economical load schedule is calculated



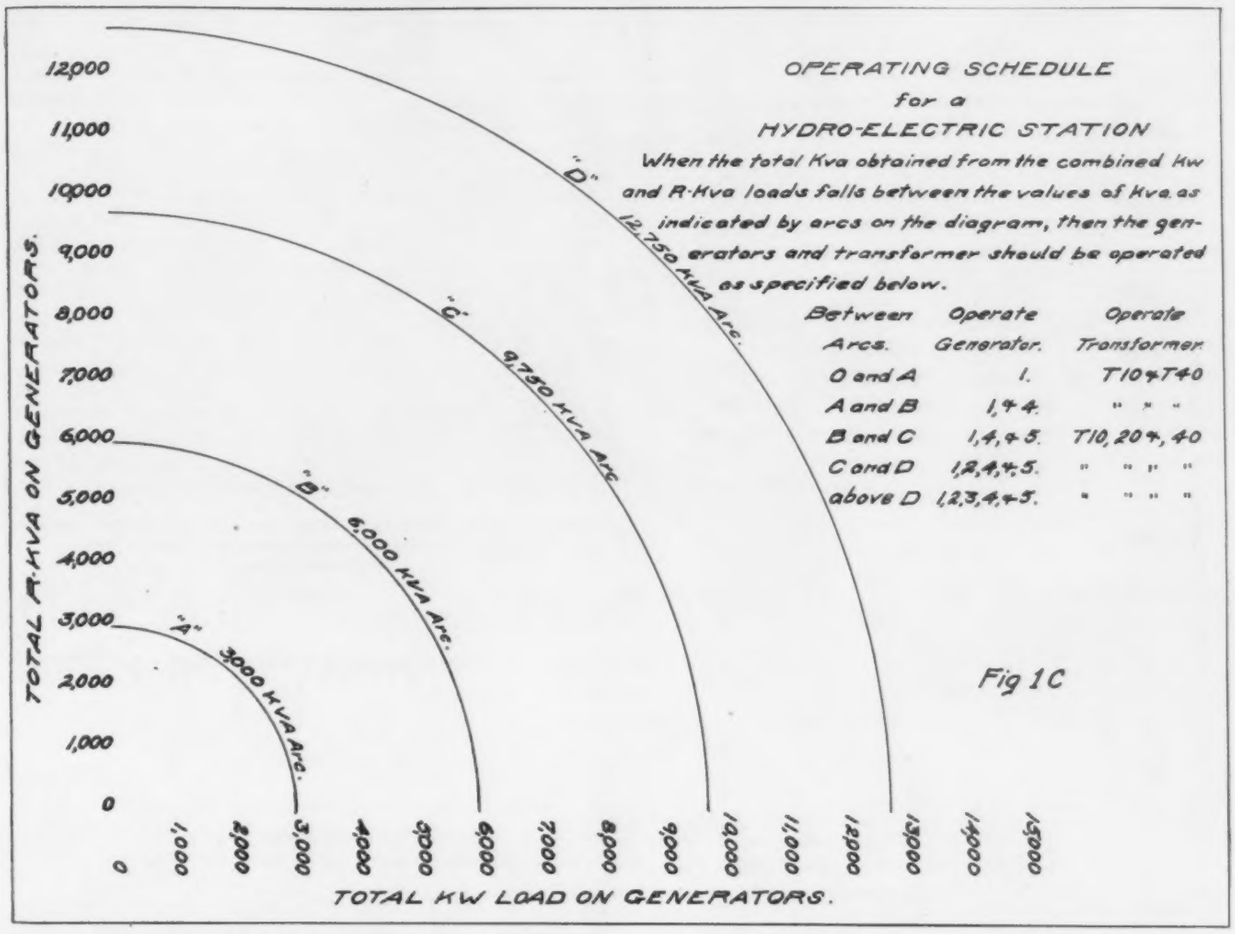


Fig. 1C—Operating schedule derived from loss study of station generator and transformer units

Beginning in this issue, ELECTRICAL WEST offers a series of articles which will cover the economics of important phases of Western utility operation. These articles, prepared by prominent engineers, will suggest methods by which savings in operating and investment charges may be effected. Modernization needs planned production for maximum economy. Involving not only the justification of capital investment but also continual adjustment to conform with new developments and practices, modernization has been the cornerstone of the industry's rapid growth. With new methods, advanced practices, and modern applications, these articles constitute a timely and valuable report of current trends.

THE EDITOR.

by which load studies on the various types of equipment were made.

To illustrate the technique, a generating station has been selected as a typical example for the development of an operating schedule taking maximum advantage of equipment characteristics and efficiency. The essential connections for this station are shown in the one-line diagram in Fig. 1B.

As this station has a number of units of different characteristics, actual over-all performance tests were made to secure input-output curves. These curves, shown in Fig. 1A, illustrate the relation between water input to the turbine expressed in second feet and generator output expressed in kilowatts.

Loss curves were then made up for the three transformer banks at the station. As shown in Fig. 2, transformer losses in kilowatts for each bank are plotted against transformer output in thousands of kva. For the particular transformers here considered, it will be noted that the point of intersection of Curves 1 and 2 falls considerably below the full load rating of one transformer bank, and likewise the point of intersection of Curves 2 and 3 falls below the full load capacity of two transformer banks. The points of intersection represent the load at which the second or third transformer banks should be added or disconnected in order to have minimum over-all losses. Similar curves have been used to show the economical loading of motor generator sets and rotary converters when there are two or more units serving the same load.

Closely related to the loss curves is the use of duration curves. Curve 1 in Fig. 3 represents a typical load duration curve. Such curves may be used for representing

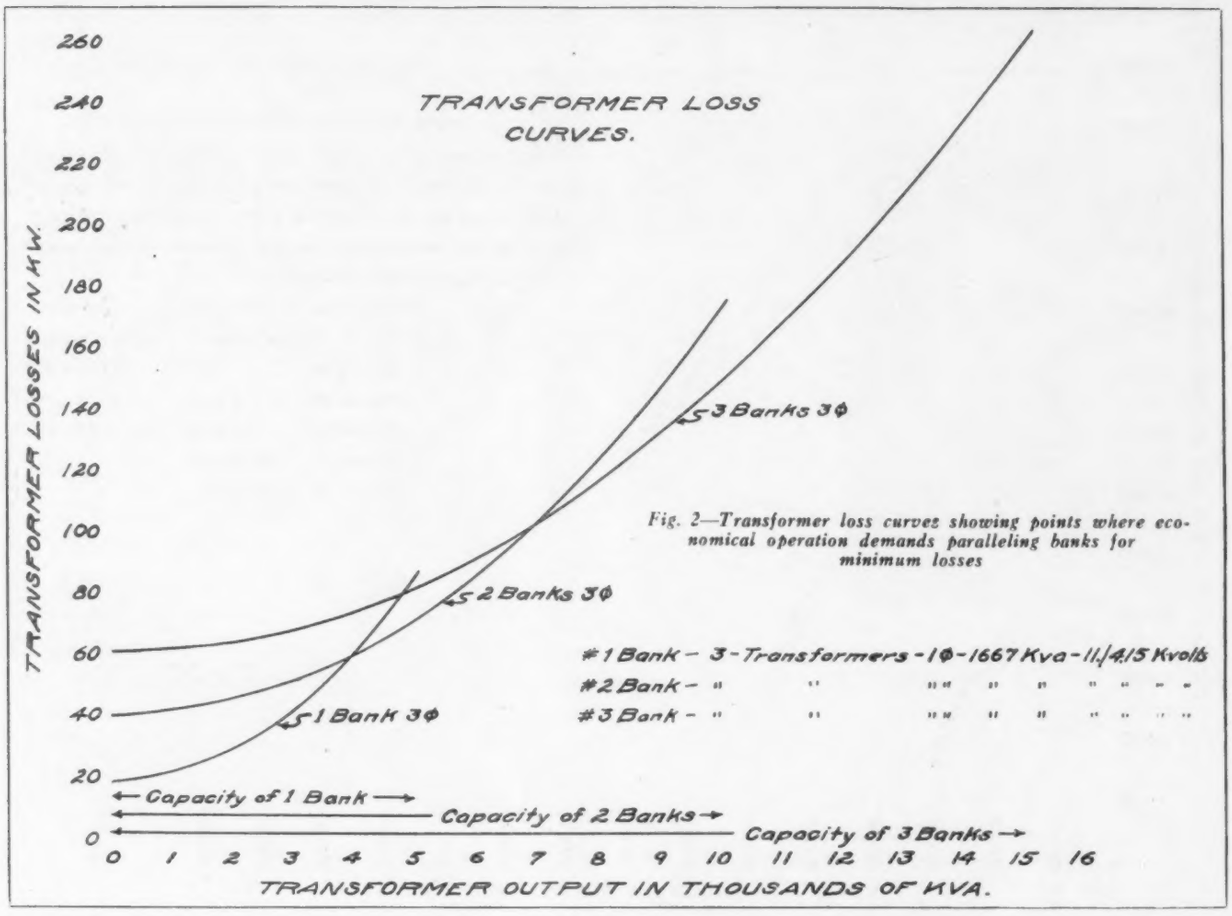


Fig. 2—Transformer loss curves showing points where economical operation demands paralleling banks for minimum losses

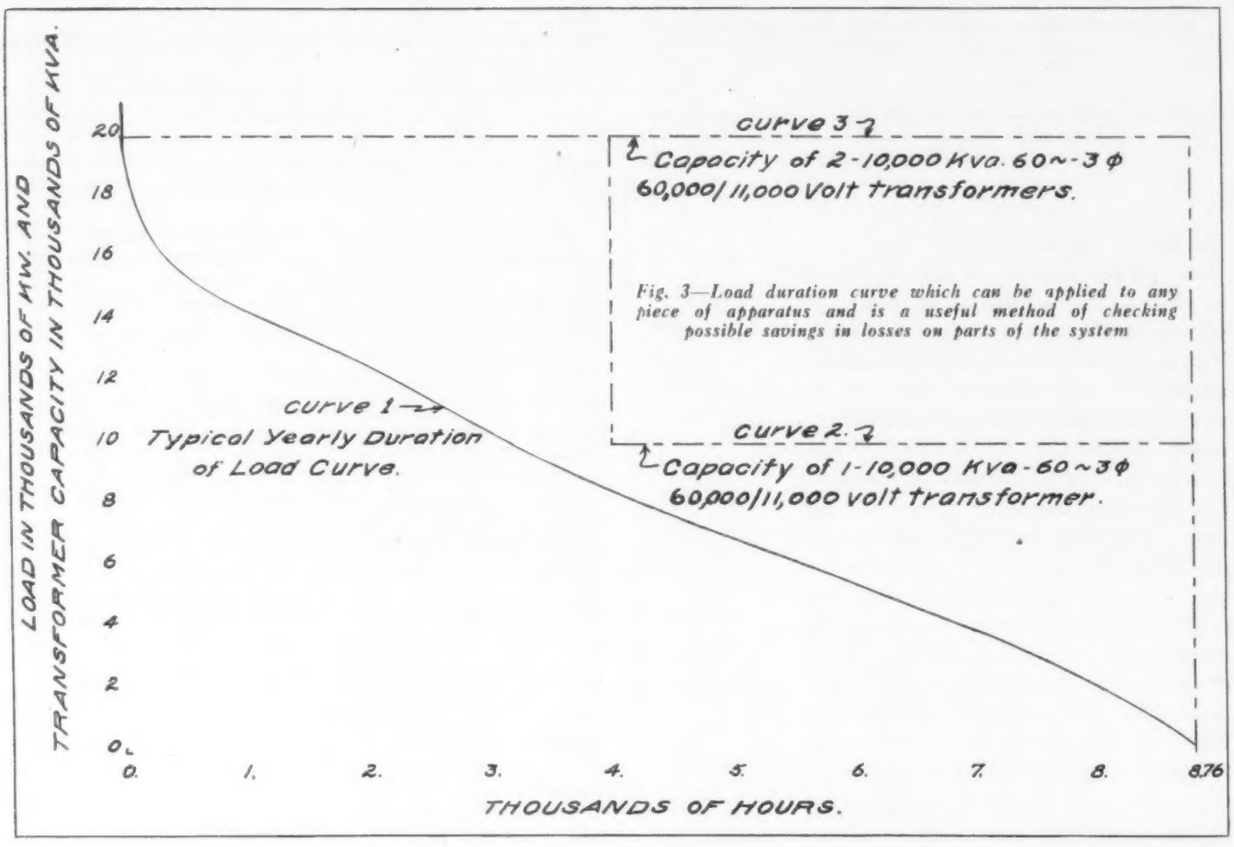


Fig. 3—Load duration curve which can be applied to any piece of apparatus and is a useful method of checking possible savings in losses on parts of the system

any type of load and are obtained by plotting values of load against the number of hours per year that such values of load have occurred. They give an excellent picture of the annual load and show the number of hours per year that it is necessary or desirable to keep a particular unit in service. They are, therefore, of particular value in estimating the possible annual savings that may be realized by adopting a particular operating schedule.

This may be illustrated as follows: Curve 2 in Fig. 3 shows an application in the case of two similar transformers of 10,000-kva. capacity where the load below 7,000 kw. is assumed to have a power factor of 75 per cent and when the load is above that figure, is assumed to have a power factor of 90 per cent. Having given the transformer iron and copper losses, it is possible to evaluate the yearly saving when one transformer is out of service the number of hours represented by Curve 2. For this particular case, the saving amounts to 64,000 kw.-hr. per year.

By combining these three curves, the operating schedule shown in Fig. 1C was devised. In this schedule priority is given to the most efficient units and account is taken both of kilowatt and reactive kva. load. By operating on such a schedule, maximum use of the available stream flow as well as minimum transformer loss, are possible.

Viewing the system as a whole, the results obtained by following the foregoing methods on other equipment indicate the possibility of making very considerable savings without adding to capital investment. Based on a net system input of 600,000,000 kw.-hr. per year, it is estimated that careful scheduling of operation would make it possible to reduce the annual losses by 3,000,000 kw.-hr., which represents one-half of 1 per cent of the system input. Considering that the equipment formerly used to supply this amount of losses is released for revenue-producing purposes, it is apparent that studies of this type might well be included as a permanent part of system activities.

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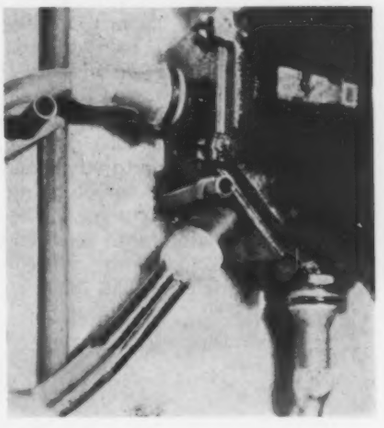
Investigation Discounts Effect Of Sheath Currents

INDUCED currents in the sheath of single-conductor, lead-covered cables have been indicted as the probable source of many of the minor difficulties experienced in underground systems. Recently a Western utility investigated the effects of these currents by conducting tests on actual installations where there seemed to be considerable heating in both the cable and junction boxes from this cause. The object of these tests was to determine the influence of sheath current on split-core measuring transformer or junction box cases. This is because of the relatively high resistance of the cable sheath and iron case which form the path for the sheath current as compared with the induced current in the sheath. That the current is small is evidenced by the results determined from the tests. Evidently the heating of the junction box must be due to current resulting from the voltage induced directly into the case itself by virtue of the proximity of the current-carrying conductor. This effect could be reduced either by putting both transformer leads in the same junction box nipple or through the use of some low permeability material around the point where the single conductor cable enters the case.

From these tests it becomes apparent that no serious error will be introduced in using the split-core type measuring sets and that sheath currents will cause from 1.5 to 9.1 per cent less current indication than actually flows in the conductor. Previously, tests of this sort were made by causing a current to flow in the sheath of the conductor. The relation between the induced currents in the sheath and the current flowing in the conductors could be duplicated in this method only with the most exacting of test conditions, and for this reason the actual test as discussed herein should give more reliable results.



Typical cable installation showing insulating nipples wiped into the cable joint at the junction box entrance

The elimination of sheath currents by use of insulating nipples has no appreciable effect upon the heating of instruments and the heating effect on sheath, junction boxes and transformers.

Four representative locations were selected as the points at which to make the experiments, and the current measurements were made with the cable sheath isolated by means of insulating nipples wiped into the sheath at locations near the junction boxes and also with the insulator bypassed by means of a copper band-clamp. The accompanying table shows the current variations found under the various conditions.

Location	Cable Size	Type of Junction Box	Current Measured With Insulating Nipple (amp.)	Current Measured With Nipple Bypassed (amp.)	Variation (%)
A	1,000 circ.mil	1,000 circ.mil (rectangular)	325	315	3.1
			380	370	2.6
B	1,000 circ.mil	1,000 circ.mil (rectangular)	270	266	1.5
			197	194	1.5
C	1,000 circ.mil	1,000 circ.mil (rectangular)	215	200	7.0
			240	230	4.1
D	1,000 circ.mil	1,000 circ.mil (octagon)	110	100	9.1
			125	115	8.0

Wishbone Design Selected For Two Northwest Lines

Strength of This Type of Structure Increased by Guying From the Point of the Wishbone. Double Plank Crossarms Improve Structural Characteristics

BECAUSE of the structural strength necessary to carry 795,000-circ.mil A.C.S.R. conductors with insulation and clearances for possible future operation at 110 kv., and because the line runs along city streets precluding the possibility of using H-frame construction, the Northwestern Electric Co., Portland, adopted a "wishbone" type of crossarm design in preference to a parallel crossarm design on a section of its line to bring power from the new Ariel plant to Portland. This section, which extends about eight miles from the south bank of the Columbia River through St. Johns to the Albina St. substation, was built for 66-kv. operation but designed so that it could be converted to 110 kv. in the future if necessary. It is built to withstand an ice and wind load of 6,650 lb. per conductor, figuring ½ in. of ice and 8 lb. of wind per square foot on the ice-covered conductor at 0 deg. F. The aluminum conductors have a conductivity equivalent to 500,000-circ.mil copper and an ultimate tensile strength of 27,950 lb.

A unique feature of the design is in guying off the point of the wishbone such angle poles as carry wishbone construction, which are invariably those of less than 30 deg. This places the guy contact at the point of greatest strain on the structure, and, with the point of the wishbone pointed toward the guy, only one insulator string swings toward the pole, while two swing away from it.

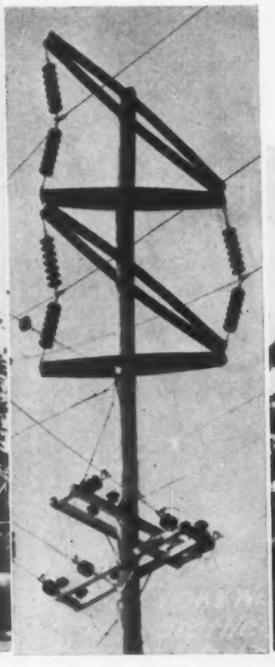
The line is provided with a balanced insulation to withstand impulse voltages to ground up to 1,260 kv. A 10-ft. insulator is installed in all guys contacting with crossarms.

Crossarms, 6x8x15 ft., are used, and the wishbone is mounted 10 in. off center so as more nearly to balance the structure physically. This gives a clearance of 5 ft. 10 in. between one conductor and the pole and of 5 ft. between the pole and the conductors on the other side. A vertical clearance of 10 ft. between conductors is maintained. On that portion of the lead which carries an 11-kv. circuit, the vertical clearance between circuits is 10 ft. The clearance requirements necessitated poles from 75 ft. to 95 ft. in length, but the wishbone construction shortened the necessary length of the poles by 5 ft. as against a parallel arm type of design.

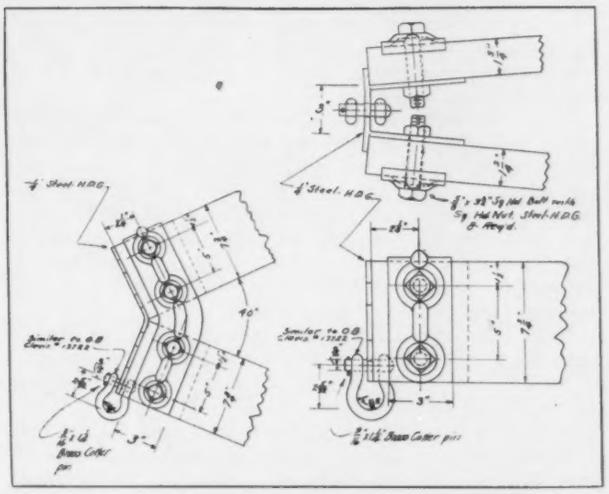
Somewhat similar considerations governed the adoption of a wishbone design for the City of Seattle's tie-line

Left—An example of guying from the point of the wishbone on a line traversing urban areas

Center—Double-plank crossarm construction for an angle structure designed to maintain proper conductor position



Below—Wishbone structure guyed from the end of the crossarm point. Special hanger for insulator necessary to maintain conductor spacing



Details of hardware used in double-plank crossarm construction. Long structural life promoted by elimination of wood-to-wood contact

between Seattle and Tacoma, seven miles of which was rebuilt last year. This line, which is to be 30 miles long when finally completed, is designed for 110-kv. operation though at present it is operating at 60 kv. The facts that H-frame construction could not be used on account of right-of-way limitations, that it was desired to gain strength as against parallel arm type of construction on single poles, and that it was desired to save space in the height of poles, since other circuits had to be carried on the lead, led to a decision to use wishbone construction.

In this case, however, the wishbone was constructed of double arms bowed around the pole with the ends brought together and clamped with especially designed steel hardware of the Ohio Brass Co. Timbers 2x8x14 ft., carbolineum treated, were used, and a special feature of the design is that at no point in the assembly is wood allowed to bear against wood. At every point of apparent contact of wood with wood, between the arms and the pole or between the wooden members of the arms, hardware is used to separate this contact so that wood bears only against steel. Another feature of the design, intended to conserve the strength of the poles, is that all dead-end strains are taken against steel bands around the pole instead of on eye-bolts bored through the pole.

Conductors are 4/0 stranded A.C.S.R. A minimum of 40-in. horizontal clearance from conductors to pole was maintained. Normal clearance on tangents is 7 ft. 5 in. on the point side of the wishbone and 5 ft. 9 in. on the side of the open end, the wishbone being placed slightly off center to secure as near a physical balance as possible.

Ten-inch clevis-type insulators, seven units in suspension, were used throughout except on dead-ends, where seven units of 11-in. ball and socket disks were used. All angles requiring dead-ends were constructed by dead-ending the conductors directly to the pole. Pole heights required ranged from 85 ft. to 115 ft.

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Underground Phase Identification

VERY frequently it becomes necessary to identify certain phases of an underground circuit at a time when it is not desirable to kill the circuit in order to trace through from the switchboard. Recently the Los Angeles Gas and Electric Corp. found it necessary to check a number of the phases on the 2,400-volt circuits where they left the power house. These circuits were numbered as they came from the bus, but as the cables were carried through a conduit to this point, it would be practically impossible to trace them without killing the circuits unless some external device could be devised for identification.

After studying the problem, two listening coils consisting of 2,500 turns of No. 30 wire, wound on a laminated core, 4½ x 5 in., were made up. The laminations were cupped to fit against the cable sheath, and the two coils were connected by a long flexible pair of conductors. As the two coils were connected in series it was necessary to mark the polarity of the windings similar to the markings used on current transformers. The hookup was completed by connecting a telephone receiver across the two flexible leads, making a connection similar to a differential relay diagram.

In operation, one coil was held against a numbered cable and the other coil then held successively against the cables which were to be identified. If the listening coils are on the same wire no sound is heard in the receiver, but when the prospecting coil is on another phase lead a very definite buzzing of the receiver indicates the fact. Tests show that this method of identification may be applied to any wire carrying over 10 amp. and it may be applied to any circuit where a rapid and accurate phase identification is necessary.

Locating Oil Leaks With Blue Chalk

OIL leaks seem to be almost synonymous with oil-filled equipment. A simple and most effective means of locating oil leaks has been in use for some time by the shop-test department of the Southern California Edison Co. Ltd. at its Alhambra headquarters. This consists simply of painting each gasket and each welded seam or other point of possible oil leaks with a mixture of blue chalk and bakelite thinner.

As each transformer, regulator or other piece of oil field equipment passes through the shop-test department, during or upon completion of the clean-up following the shop or test work each piece of equipment is painted as described. It has been found that the blue chalk mixture shows up permanently and very appropriately on even very small oil leaks that otherwise would be very difficult to locate. Another advantage lies in the fact that the chalk mixture is easily cleaned off when the equipment is to be painted. This chalk test for oil leaks has proved popular because of its economy and effectiveness.

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Metal Coating Decreases Insulator Radio Interference

SPECIALLY treated insulators used in conjunction with choke coils materially reduce radio interference, Puget Sound Power & Light Co. engineers have found. The head of the insulator is coated with a metal deposit which extends onto the top shell for the distance of 1 in. The point of junction of the remaining shells is coated similarly. The insulator is equipped with a lead alloy thread and the inside of the lower shell is coated for a distance of 2 in. downward from the pinhole. Decreased flashover values are compensated for by increasing the size of the lower shell.

Chart Simplifies Guy Calculations

By G. F. HARRIS
Assistant Engineer,
Portland General Electric Co.

IN ELECTRICAL transmission and distribution lines, when the conditions of loading are such that the supporting structure will not carry the stress, guys are used, and for wooden poles the guys are assumed to take the entire stress, the pole acting merely as a strut.

The accompanying chart is for the solution of most ordinary guy problems, but is not applicable to side guys. The stresses used are in accordance with the rules of the National Electrical Safety Code. The requirements of railroads for the guying of lines crossing over their tracks and signal lines often call for a greater factor of safety in guys than is required by the N.E.S.C. For example, some of the railway companies require a factor of safety of three for all guys involved in crossing spans. For such cases the size of guys cannot be read directly from the chart, but the stresses can be read and then the proper size of guy determined without the chart.

The chart is a combination of five direct reading charts, or sections, each of which is one step in the solution of the guy problem.

In Section No. 1 (lower right) stress in conductor is plotted against span length. The curves for the different sizes of copper conductor are plotted directly from National Electrical Safety Code tabulated values of customary and recommended maximum stress under medium loadings for wires for given sizes strung in the various span lengths as shown. (See N.E.S.C. Handbook No. 10, fourth edition, Table No. 35.)

If the conductor is strung so that the maximum stress under load will be the same for all values of average span length, then Section No. 1 of chart will be unnecessary and one can start with section No. 2, assigning proper scale of conductor size to the ordinates. An example of this is shown in the case of aluminum conductors in which the maximum working stress is taken as equal to the elastic limit (one-half the ultimate) in all sizes of conductor regardless of span length.

Section No. 2 is a simple multiplying chart for various numbers of conductors in which the maximum stress in all conductors on one side of support is plotted against the maximum stress in each conductor.

In Section No. 3 the total maximum stress values in all conductors on one side of support are plotted as radii of arcs, against the resultant in conductor (horizontal) plane of all conductors attached to the support, as ordinates for all different values of line angle.

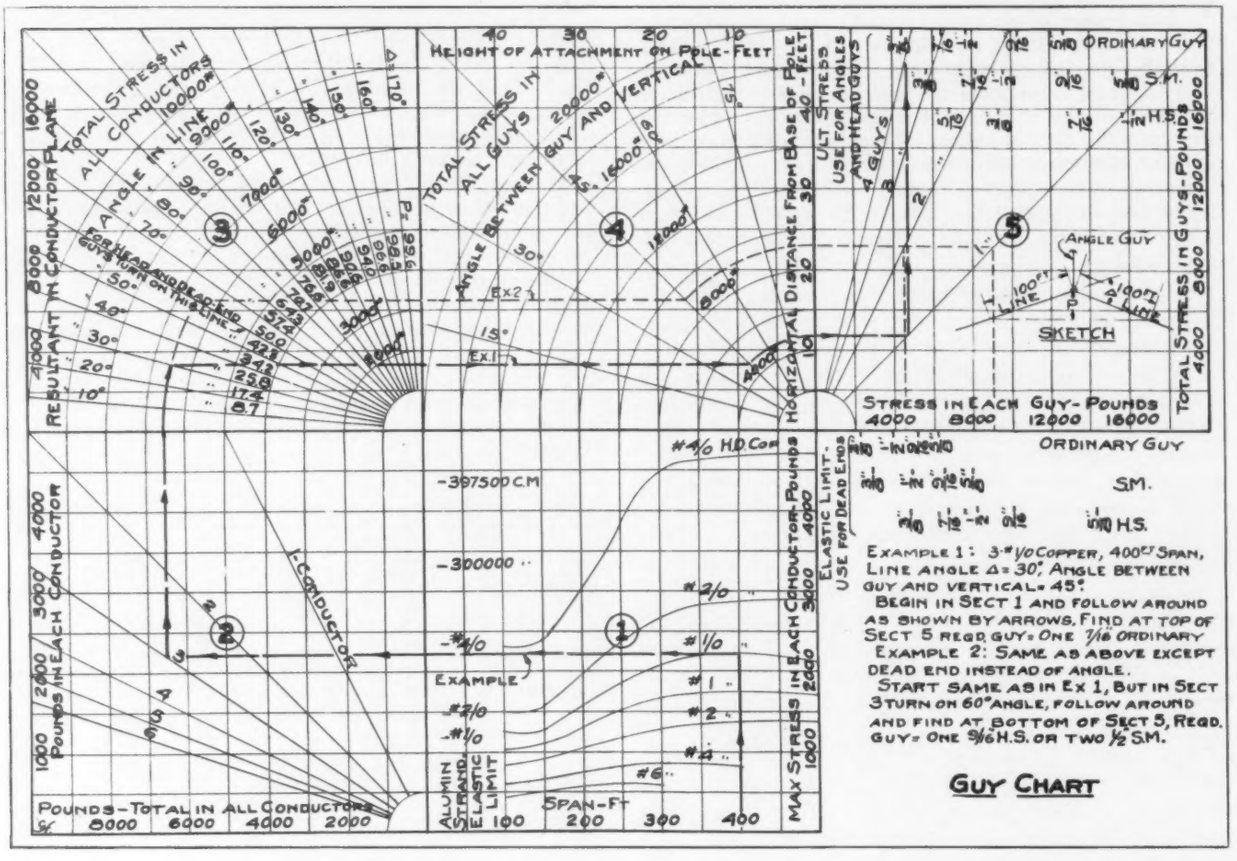
For line angles, as shown on the sketch on the chart, the resultant stress in conductor plane is:

$$S_R = 2 \text{ Sin.} \frac{\Delta}{2} \times S_T$$

Where S_T=total stress in conductors on one side of support,

Δ = line angle

This is the equation which is to be solved by section No. 3 of chart. To solve this the line angles as shown to scale are one-half the actual values, but are marked


HEIGHT OF ATTACHMENT ON POLE-FEET
TOTAL STRESS IN ALL CONDUCTORS
ANGLE IN LINE
RESULTANT IN CONDUCTOR PLANE
TOTAL STRESS IN ALL GUYS
ANGLE BETWEEN GUY AND VERTICAL
HORIZONTAL DISTANCE FROM BASE OF POLE
ULT STRESS USE FOR ANGLES AND HEAD GUYS
ORDINARY GUY
S.M.
H.S.
TOTAL STRESS IN GUYS-POUNDS
ANGLE GUY
SKETCH
STRESS IN EACH GUY-POUNDS
POUNDS IN EACH CONDUCTOR
POUNDS-TOTAL IN ALL CONDUCTORS
SPAN-FT
ALUMIN STRAND ELASTIC LIMIT
MAX STRESS IN EACH CONDUCTOR-POUNDS
ELASTIC LIMIT-USE FOR DEAD ENDS
EXAMPLE
#4/0 H.D. Copper
397500 C.M.
300000
#2/0
#1/0
#1
#2
#4
#6
EXAMPLE 1: 3-#1/0 COPPER, 400FT SPAN, LINE ANGLE Δ = 30°, ANGLE BETWEEN GUY AND VERTICAL = 45°. BEGIN IN SECT 1 AND FOLLOW AROUND AS SHOWN BY ARROWS. FIND AT TOP OF SECT 5 REQD GUY = ONE 7/16 ORDINARY
EXAMPLE 2: SAME AS ABOVE EXCEPT DEAD END INSTEAD OF ANGLE. START SAME AS IN EX 1, BUT IN SECT 3 TURN ON 60° ANGLE, FOLLOW AROUND AND FIND AT BOTTOM OF SECT 5, REQD. GUY = ONE 9/16 H.S. OR TWO 1/2 S.M.
GUY CHART

full delta values. Thus angle 90 deg. as shown on chart scales 45 deg.

Also, any length on the ordinate (y axis) represents twice the value of the same length on the abscissa (x axis) or, in other words, "Y" scale equals one-half "X" scale.

Then reading through Section No. 3 of chart, as shown by the given example, solves the above equation.

It is customary, in some localities, to designate an angle in the line not by the delta value but by the length "P," determined as shown in sketch. So in addition to the value of the line angle, the corresponding value of "P" is also shown on chart. This value of "P" is sin Δ multiplied by 100, since the hypotenuse of the angle used for determining "P" is 100 instead of unity.

For head guys and dead-end guys, the resultant in conductor plane is one-half the value which would be obtained from the chart if the line angle is taken as 180 deg. That is, if the line doubled back on itself, the angle would be 180 deg., and we would read clear around to 180 deg. and solve the problem in the ordinary way; but head and dead-end guys balance the stress of conductors on one side of the support only, so half the 180-deg. value as plotted must be used in the solution of this problem. Instead of following around to 180 deg. as marked on the chart (scale 90 deg.) we turn at the angle marked 60 deg. (scale 30 deg.) for sine 30 deg. = one-half of sine 90 deg. That is, the ordinate on any arc for an angle marked 60 deg. = one-half the ordinate on the same arc for an angle marked 180 deg.

In Section No. 4 the resultant in conductor plane as ordinate is plotted against total stress in all guys, as radii of arcs for different values of angle between guy and vertical. The angle between guy and vertical is also expressed by plotting the height of attachment of guy on pole as ordinate.

This gives the solution of the equation:

$$S_G = \frac{S_R}{\text{Sin} \propto}$$

S_G = Stress total in guy

S_R = Resultant stress in plane of conductors

$\propto$ = Angle between guy and vertical

Section No. 5 is a multiplying (dividing) chart in which the total stress in all guys is plotted against the stress in each guy for different numbers of guys. Taking three different guy materials, at the top of this section is shown the size of guy in which the ultimate stress is equal to the stress in each guy as shown by the same abscissa. The ultimate value of guy stress is permitted by N.E.S.C. for angle and head guys; therefore, for these types of guys read at top of chart for correct size to use.

At the bottom of this section is shown the size of guy in which one-half the ultimate stress is equal to the stress in each guy as shown by the same abscissa. One-half the ultimate is the maximum stress permitted by N.E.S.C. in dead-end guys. (Rule 261-C.) Therefore, for dead-end guys read required size at bottom of section.

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DNIEPROSTOI, Soviet Russia's great hydro electric plant on the Dnieper River, is reported to have received its first test on May 1. Power from its three 84,000-hp. units will be available for transmission to the great industrial centers now being completed in August. Present plans include the erection of a 400-kv. transmission line to Svire and Leningrad, a distance of approximately 800 miles from the generating station.

Stump Removal by Electricity Proves Inexpensive

THROUGH the efforts of Washington State College, an electrical apparatus for removing stumps has been introduced into northwestern Washington. It consists of a ¼-hp. repulsion induction motor, a 12-in. blower, two distributors fitted with eighteen taps upon which sections of garden hose are attached, and a number of lengths of pipe. Air is forced into the roots of the stump at many points, aiding combustion.

With a 3-c. power rate, a 4-ft. stump can be burned out completely in 14 hr. for 7½ c. Clearing land in this manner is estimated to cost approximately $2 per acre, as against $300 per acre with old methods.

New Books

HANDBOOK OF INDUSTRIAL ELECTRICITY, by Max Kushlan. Fabricoid bound; 7¼x4¾ in.; 535 pages ;illustrated. First edition, published 1931 by McGraw-Hill Book Co., Inc., New York. Price $4. For sale by McGraw-Hill Retail Room, 883 Mission St., San Francisco.—Practical information on electricity as applied to industry is presented in a readily assimilable manner. Topics are arranged in a logical order suitable for immediate reference. The book treats wiring in a comprehensive manner, including wiring for light, power, telephones, public and industrial buildings, and general outdoor installations. In addition, data for the estimator and electrical contractor and handy tables on electrical industrial practice are included. The book should prove a valuable reference for electricians, foremen, inspectors, and contractors.

GENERAL ENGINEERING HANDBOOK, by Charles Edward O'Rourke, assistant professor of structural engineering, Cornell University. Fabricoid bound; 5x8 in.; 921 pages; illustrated. First edition, published 1932 by McGraw-Hill Book Co., Inc., New York. Price $4. For sale by McGraw-Hill Retail Room, 883 Mission St., San Francisco.—Fundamental engineering data are assembled and presented in a compact pocket-size book where they are available as a ready reference for a practicing engineer and student. The book is divided into 31 sections, each section dealing with a phase of general engineering problems. To incorporate all the desirable material in a single volume, it has been necessary to reduce the descriptive matter, historical facts and derivations of equations to a minimum, but the principles, formulas and applications for practically all engineering problems are included in the book. Sections are grouped in distinct general divisions—mathematics, hydraulics, surveying, water power and steam power plants, engines and pumps, and electricity—each of which is further subdivided to facilitate reference and to provide a more comprehensive treatment of the particular subject.

RECORDING SOUNDS FOR MOTION PICTURES, edited by Lester Cowan for the Academy of Motion Picture Arts and Sciences. Cloth bound; 6x9 in.; 403 pages; illustrated. First edition, published 1931 by McGraw-Hill Book Co., Inc., New York. Price $5. For sale by McGraw-Hill Retail Room, 883 Mission St., San Francisco. —The book presents a thorough treatment of the latest developments in the motion picture art. Four general divisions are included,—sound recording equipment, film records, studio acoustics and technique, and sound production. Each division consists of a number of chapters on various phases of the subject, written by authorities on that particular element of sound reproduction. Treatment of the subject is comprehensive and should make it a valuable reference book, both for the sound engineer and the student of this new development of the motion picture art

The Cash Register Value Of Complete Electrification

In This Second Article on the Sunset Tower Apartments, the Author Offers Operating Data to Prove the Economy of Electricity and Impressive Facts to Show the Worth of Cooperative Selling

By H. H. DOUGLAS
Electrical Heating Engineer, Southern California Edison Co. Ltd.

OPERATING cost data on the Sunset Tower Apartments*, in Los Angeles, are of particular interest, inasmuch as there has been such a small amount of exact information of a similar nature available heretofore. Builders, architects and prospective apartment house owners are equally as interested as engineers, electrical contractors, manufacturers of electrical equipment, and the electrical industry as a whole.

The apartment has operated during the past seven months at very nearly the energy cost estimated at the time the job was sold and, in fact, at even less than the estimate—even in the face of one of the coldest winters on record in Los Angeles. Most heating requirements have averaged from 40 to 80 per cent above normal for each month. Actual energy costs for this seven months' period for all purposes was $5,134.96 as compared with $5,720, the estimated cost made up at the time the job was sold. This amounts to a saving of $595.04, or 10.4 per cent of the estimated cost. The estimated annual cost on which the job was sold was $7,551, and it is highly improbable that this will be exceeded. This amounts to approximately $15 per apartment per month average cost spread over a year's period.

Month	Maximum Kw. Demand	Kw.-hr. Used	Actual Cost	Present Occupancy Factor (%)	Monthly Load Factor (%)	Monthly Demand Factor (%)
October	64	13,600	$375.00	60	28.5	6.6
November	192	42,080	722.04	74	30.3	19.9
December	224	63,200	924.00	82	37.8	23.2
January	253	70,880	981.60	88	37.7	26.2
February	283	69,760	973.20	95	35.5	29.3
March	149	34,240	620.12	95	31.7	15.5
April	141	28,000	539.00	95	27.5	14.6

The daily maximum demand for any month varied as to time of month and day. For instance, the maximum demand for November occurred on the 23rd at 6:30 p.m., for January on the 15th at 9:30 a.m.

On some of the extremely cold days during the winter, the daily load factors ran as high as 68 per cent, much higher than would be expected, and very gratifying in that the character of the heating load is really better than was previously expected. For instance, we estimate that only 3,000 kw.-hr. of the 28,000 used in April was for heating purposes and the larger portion of this was used during the last three days of the month, during which Los Angeles had some pretty chilly weather. Similarly, we estimated that approximately 12,000 kw.-hr. of the 34,240 used in March was for heating. Thermostatic control should be given due credit for materially assisting in keeping down the wasteful use of heat, and smoothing the load curve.

After the owners had decided to make the Sunset Towers an electric apartment, they began an intensive study of all available equipment in order to select that

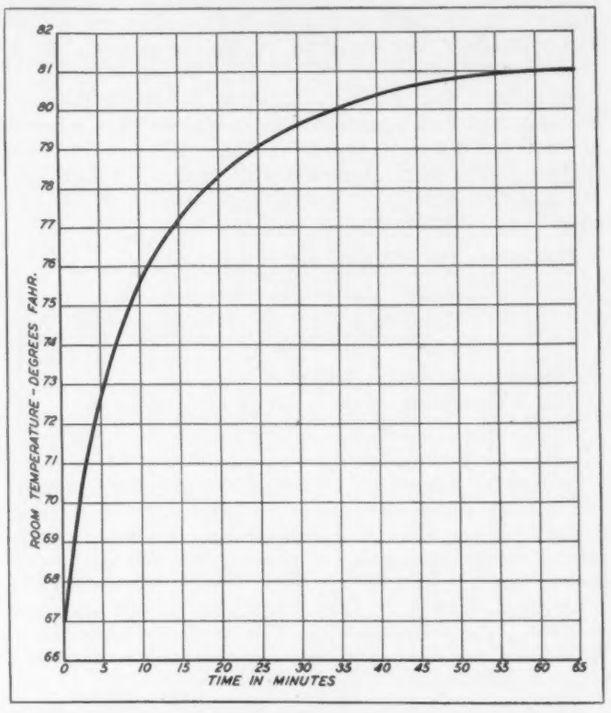


Chart showing the average of five thermometers used in the electric heating speed test. Maximum temperature variation of any point in room 5 ft. above floor was not greater than 1 deg. from average

which best suited their requirements. Two factors guided the selection of fan-type heaters: greatly increased speed in heating and improved and uniform distribution of heat in the rooms.

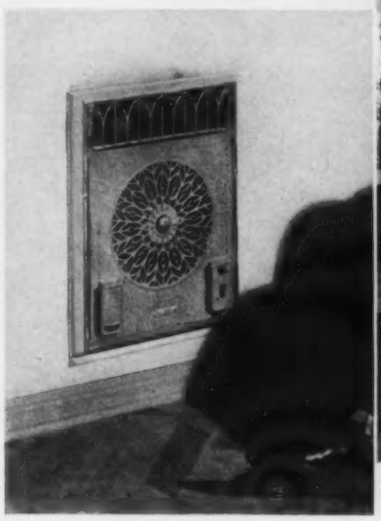
The owners, manufacturers* and the Edison company representative were anxious to know exactly what performance factors were to be expected, so tests were made on electric heating on Oct. 22 and 23, 1931, in the living-

* The first article on this building was published in the May 1, 1932, ELECTRICAL WEST, under the title, "The Whole Industry Makes a Sale."

* Equipment included in this building includes Hoffman Thermador heaters, Hotpoint and Graybar ranges, General Electric refrigerators and Westwood kitchen ventilators.

Right—Typical living room (Apt. 602) showing character of furnishings and general arrangement. Note the mantel with built-in heater and the thermostat on the end of mantel

Below—Standard type of heater used throughout the apartments, except in the fireplaces



room suite of apartment 602, a northeast apartment on the sixth floor. This suite is irregular in shape, consisting of the living room proper, approximately 14x23 ft., the dining-room alcove 10x10 ft., and the entry hall 6x7 ft. All are interconnected either by full-size openings or by large arches. The total gross volume of the three connecting rooms is approximately 3,700 cu.ft., with approximately 120 sq.ft. of exposed exterior glass area. Exterior walls are 8-in. concrete. Apartments above and below were both vacant and were not heated during the tests. In the apartment are two heaters: a 4,000-watt Thermador built into the mantel on the south wall of the living room, and controlled by a thermostat through into the end of the mantle piece, and a 2,000-watt Thermador built into the northeast corner of the dining alcove and also controlled by a thermostat built directly into the heater. Before starting the tests, all windows were opened wide for two hours in order to cool the room as much as possible before dark. The tests were not started until the room temperature appeared practically to follow outside temperature (though approximately 7 deg. F. above outside temperature, which was 60 deg. F. at 8 o'clock p.m., and dropped to 56 deg. F. at midnight.

Standard mercury bulb thermometers were located at five different points in the room and suspended 5 ft. above the floor. Graphic recording thermometers also were installed at three of these five points; the center of the dining alcove, the center of the living room proper, and the center of the bay window in the living room about 1 ft. in from the glass. Temperatures were read on the mercury bulb thermometers every 5 min. and the tabulation of readings is listed at the right.

It is of interest to note the remarkable uniformity with which temperatures came up at every one of the five points. Particular attention is called to the fact that maximum departure from average room temperature did not exceed 1 deg. F. plus or minus. The average temperature was raised 5 deg. F. in 5 min., 8.4 deg. in 10 min., and 10.6 deg. in 15 min. The outside temperature at 8 o'clock was 60 deg. and at 9 o'clock it was 59 deg. The thermostats were set to attain and maintain a temperature of approximately 80 deg. inside. The thermometers were difficult to read closer than ½ deg. in any case, with the possible error of observation of ½ to 1 deg. plus or minus. However, the average of the five thermometers perhaps would reduce the error in observation to a practical minimum.

After the heaters had been on the line for approximately one-half hour, the thermostats began to alternate in and out, an effect shown on the heating curve.

These tests were made for the purpose of determining initial heating speed and uniformity of heat distribution, both of which were established to a satisfactory degree. The cold walls, of interior plaster on concrete for the outside, and of interior plaster on hollow tile for the inside, absorbed an increasingly large percentage of the input as the temperature rose. When these walls are warmed, the rapid absorption slows up. Celotex on similar walls would permit a much straighter line temperature curve than that illustrated.

Reviewing the Facts

It might be well to review some of these facts covered and to consider the cash value of such cooperative selling as was used on this job. The electrical industry as a whole has been indifferent to the tremendous possibilities in volume as a result of complete electrification. It may be true that the central station should lead the industry in promoting complete electrification, but if the industry

TEMPERATURE READINGS, APT. 602

Time	Thermometer Number 1	2	3	4	5	Average Temperature
8:03 p.m.	66.0	68.0	67.0	67.0	67.0	67.0
8:08 p.m.	73.0	72.0	71.0	72.0	72.0	72.0
8:13 p.m.	76.0	75.0	75.0	76.0	75.0	75.4
8:18 p.m.	78.0	77.0	78.0	78.0	77.0	77.6
8:23 p.m.	78.5	77.5	78.5	78.5	78.0	78.2
8:28 p.m.	79.0	78.0	79.0	79.5	79.0	78.9
8:33 p.m.	79.5	79.0	79.0	80.0	80.0	79.5
8:38 p.m.	80.0	79.0	80.0	80.0	80.0	79.8
8:43 p.m.	80.5	79.5	80.0	80.5	80.5	80.2
8:48 p.m.	80.0	80.0	80.5	81.0	81.0	80.5
8:53 p.m.	80.5	80.0	80.5	81.0	81.0	80.6
8:58 p.m.	81.0	80.0	80.5	81.5	81.0	80.8
9:03 p.m.	81.0	80.5	80.5	82.0	81.0	81.0
9:08 p.m.	81.0	80.0	80.0	82.0	82.0	81.0

INDUSTRY BENEFIT FROM ELECTRIFICATION

ITEMS	Wiring Only Electrical Contractor Amount	% of Total Job	Appliances Electrical Merchandiser Amount	% of Total Job	Total Job To the Electrical Industry as a Whole Amount	% of Total Job	Estimated Kw.-hr. Used Annually
A. As installed, completely electrified	$14,600	43.5	$18,900	56.5	$33,500	100	446,500
B. As originally planned	6,480*	90.0	720	10.0	7,200	100	123,500
C. Increased volume in business created by complete electrification	8,120	31.0	18,180	69.0	26,300	100	323,000
D. Per cent increase item A over B	225%		2,600%		465%		360%

* Includes item of $480 for wiring in bathroom heaters.

as a whole could envision the vast potential field for increased and profitable volume, and would become volume conscious in terms of cash register value, converting this consciousness into organized coordination, the volume would increase to a point where red ink would turn black.

This can be done only when every employee in every branch of the industry, from the executive right down to the man on the job, realizes and appreciates that this work is his and that volume is as much a personal matter as vacations, dividends, or pay checks. We must learn so to cooperate and coordinate our efforts under some sort of intelligent direction that, working as an organized industry unit, we may be able to convince the consumer that he cannot afford to do otherwise than completely electrify his installation.

Gross volume is, or at least ought to be, an indication of trend of value in the average job. Therefore, some statistics on volume on this particular job may be indicative of what could be done on a job of similar character. These data are given with a certain degree of hesitation and with a word of caution against "rubber stamping," because each job is a study in itself.

The Sunset Tower Apartments was originally laid out by the architect, accepted by the owners and approved by the investment house financing the building on a basis of steam heat, gas ranges and multiple-unit refrigeration, using electricity only for light, power and bathroom radiant-type heaters. It was not a Red Seal job. The electrical contractor was to get $7,200, of which $1,200 was chargeable to electrical heating in the bathrooms, using only $6,000 for ordinary light and power wiring.

By united industry cooperation, the job was converted to electric heating, electric cooking, individual electric refrigeration and Red Seal specifications. As a result of this change, the industry benefited greatly, as shown by the following comparative data.

DISTRIBUTION OF COSTS OF ELECTRIFICATION

1. Original light and power—wiring only	$ 6,000
2. Red Seal extra cost	833
3. 39 ranges installed complete	7,050
4. 180 heaters installed, including temperature and remote control	11,767
5. 39 refrigerators installed	7,850
Total value of job to industry	$33,500

In order to show how this $33,500 is distributed—what it meant in increased volume to the electrical contractor, to the electrical manufacturers, and what it means in kilowatt-hour sales to the utility, the data at the top of this page are submitted.

There can be no question of the benefits to everyone concerned. These figures should convince the *electrical contractor* that his volume, provided he does a selling job for complete electrification, will be more than doubled. The figures on the contractor's possible volume have been divided into two groups—wiring only, and appliances—in order to show the *manufacturer of appliances* what complete electrification means to him in the form of sales. It meant 26 times the volume in this particular instance. Should not the manufacturer of heaters, refrigerators and ranges be interested in this increase in volume?

The manufacturers of conduit, wire, switchboard equipment and all wiring devices should be equally interested because of the increased volume of their business.

There is no doubt but that *central station* energy sales will be nearly four times what they would have been without heating and cooking.

The *owner*, Mr. Moffett, is well pleased, and his next apartment, an 18-story project with twice the volume of the Sunset Tower, will be a duplicate of the first except for a few minor changes deemed advisable.

And the *consumer*. That he is satisfied is evidenced from the fact that only two of the apartments had not been leased by March 1 and, inasmuch as the average apartment occupancy usually is much lower, some of the credit for this showing can be given to complete electrifition and to the satisfaction of the consumer with the convenience of electric appliances.

Prospective tenants unconsciously are among electricity's greatest salesmen. Owners generally appreciate the importance of giving the tenant what he wants—the latest and most modern conveniences—because the tenant is willing to pay for it and will move to more modern locations if the equipment becomes obsolete. Properties when built must be modern, or the owners will suffer reduced returns through vacancies or expensive modernizing. For these reasons, electricity in all its uses is being given consideration as never before by thoughtful builders and discriminating tenants. Let us, therefore, endeavor to forge the entire electrical industry into an effective working unit which, through intelligent direction, may so function as to cash in on the potential value to the industry of complete electrification to the greatest possible extent.

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Small Theater Acquires Big Show Class

LITTLE neighborhood movie houses have suffered by comparison with big houses since the advent of talkies. Acoustically and decoratively they have been deficient. One, the Union Theater, on Union St. in San Francisco, gave up the race five years ago. Not long ago Ray Kiefer, architect who won renown for his Sweet's Persian Gardens colorama installation, was called on to plan the remodeling and modernization of the little house. Celotex, tinted attractively and used to line walls and ceiling, solved the acoustical problem. A

Universal sound system was installed, but with the assistance of N. Graves, of P. G. and E. lighting sales, lighting did more to modernize the theater than anything else.

The exterior now displays a large neon sign. Its entrance lobby is floodlighted by the two 200-watt and two 400-watt flood spots playing on the box-office. The ceiling and sunburst decoration over the box-office are lighted by a cove containing 85 75-watt lamps in a metal trough.

Inside the entrance arch may be seen the four floodlights used to illuminate the box-office. Eight-five lamps light the sunburst effect at the rear

For the interior, Celotex solved the acoustical problem and special shades over light wells solved the lighting problem

Special shades were made to cover the former light wells in the auditorium ceiling. In these are now placed eight 60-watt and four 25-watt lamps, the latter in color on a circuit for dim lighting. A colored design cove of Celophane mesh conceals the lamps. Wall brackets of similar material conceal 15-watt lamps. Aisle lights are provided by using Major clamp-on type units every few rows of seats.

The installation was made by Kling & Kremer, electrical contractors, located across the street from the theater.

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Photoflash Lamps Sell Floodlighting

PHOTOFLASH lamps are used by Pacific Power & Light Co. to secure a night photograph of a subject to simulate the appearance of a floodlighted job. This method of photographic demonstration of the effect of floodlighting has been successful in selling several installations. It is used in smaller districts where sample floodlighting enquipment is not available for a temporary installation to give an actual demonstration; where demonstration is possible the photoflash method is not recommended.

In the service station illustrated the picture at the left is an ordinary 3-minute time exposure. The picture at the right is the same station, but the picture was taken with the aid of seven photoflash lamps, three in a reflector at the left foreground and four in a reflector at the right foreground. The pictures are then shown to the prospect to illustrate the better lighting effect. A good photographer is necessary to insure the success of this method of selling.

Night view showing one-half of the exposition room lighted. The automobiles seen have been parked by visitors to the General Motors exhibit, with which the rehabilitated Palace opened

Retouching an Old Master

Light, Expertly Brushed Into the Picture, Has Helped Transform What Was a World-Famous Art Gallery Into a Practical, Money-Making Exposition Hall

By W. P. Bear
Lighting Sales Engineer,
Pacific Gas and Electric Co.

DURING the Panama-Pacific Exposition in San Francisco in 1915, one of the most talked-of edifices was the Palace of Fine Arts. It remains as the sole survivor of all the beautiful structures erected for the exposition and, until recently, had been crumbling away.

Now in the process of rehabilitation, officials of the San Francisco Park Commission recently requested that a high-class lighting system be designed and installed in the building. The suggestion contemplated the lighting of the main structure and was extended to include suitable lighting circuits in the rear of the building for automobile parking purposes, a circuit within the building for the night watchman's use, and the temporary lighting of the colonnade for traffic purposes.

The main structure is 900 ft. long, 135 ft. wide, from 30 to 45 ft. high, and has a glass roof supported on 22 heavy structural steel arches. The walls are gray in color and the floor is black asphaltum; therefore, very little reflecting surface is available. The colonnade is constructed of light, tan-colored travertin, and is about 1,000 ft. long.

It was understood that the building would be used for expositions, and perhaps for recreational purposes, with tennis courts indoors; therefore, a system of circuit and fixture controls was planned so that it might be safely and conveniently used by the public within certain limits. The design of the structure favored the installation of exposed conduit and the contours and spacing of the arches were such that a very simple layout would result in an even distribution of lights from high-bay lighting units. Six 2,000-watt pendant fixtures per arch on 22 arches require 132 lighting fixtures, totaling 264 kw. for general lighting within the main room. The fixtures contain 2,000-watt, 115-volt, hard, clear glass lamps, all supported 30 ft. above floor level.

An average of 60 foot-candle measurements on a carefully plotted area was made with an illuminometer and indicated an average of 45 foot-candles at a point 36 in. above the floor level. This was secured with new lamps in new, clean reflectors, and with normal voltage delivery at the lamp sockets. In the workable area the maximum and minimum intensity ranged about 3 to 1.

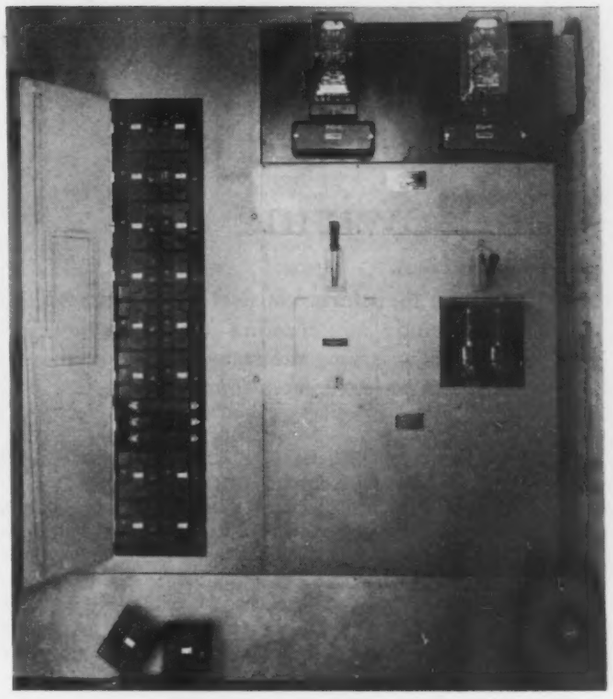
Thirteen 500-watt lamps, mounted in elliptical angle reflectors supported on the back wall of the building, 30 ft. above grade, provide a very good illumination for automobile parking purposes. Twelve 500-watt lamps, mounted in glass-steel diffusers and supported in the lantern structure on the second line of the building, about 45 ft. from the floor level, provide an evenly distributed illumination for night watchmen and patrol service. Twelve 1,500-watt lamps in pendant-type lighting units with 16-in. medium alabaster rippled-glass bowls, mounted on 48-in. plain-type scroll brackets and supported on the inside face of the colonnade structure, 30 to 60 ft. above ground level, were originally intended to provide temporary lighting for driveway and parking purposes. These units provided a very even illumination on the facade of the main structure and, since the lights are not visible from the front of the nearby lake, this colonnade lighting has created a condition of silhouette in bringing out the beauty of the colonnade structure and has developed a great amount of public interest.

Electric service is furnished by the Pacific Gas and Electric Co. and terminates in two concrete vault struc-

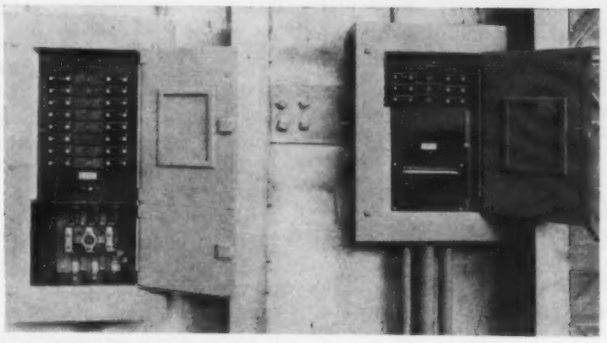
tures which were part of the original design. Service at 2,300/4,000 volts is transformed in each vault to 120/208 volts, three-phase, four-wire, from which point it is carried on busbar structure to an adjoining vault in which there are meters for light and power and a modern power distribution center. Circuits are protected by convertible and removable plug fuse controls, as illustrated. The main control for lighting each half of the building is mounted in a third vault and consists of two 400-amp., three-pole fused switches controlling three-phase, four-wire service to each quarter of the building area.

All main switchboards, distribution centers and lighting control panels are dead-front, dead rear, safety type. The main four auxiliary lighting panels consist of high-speed, double-break, mechanically operated receiving-type control switches; mains for lighting distribution panels in the Exposition Hall are magnetically operated swiches, remote-controlled electrically by push buttons mounted in the accessible portion of the control panel.

The four-wire service is carried directly to the busbars of the lighting distribution panels and the branch circuits on all panels are equipped with automatic No-Fuse-type breakers. No plug or cartridge fuses or knife switches are used in any branch circuits. All panels and switchboards are front-of-wall type. Care has been exercised that all main switches, main circuits and branch circuits

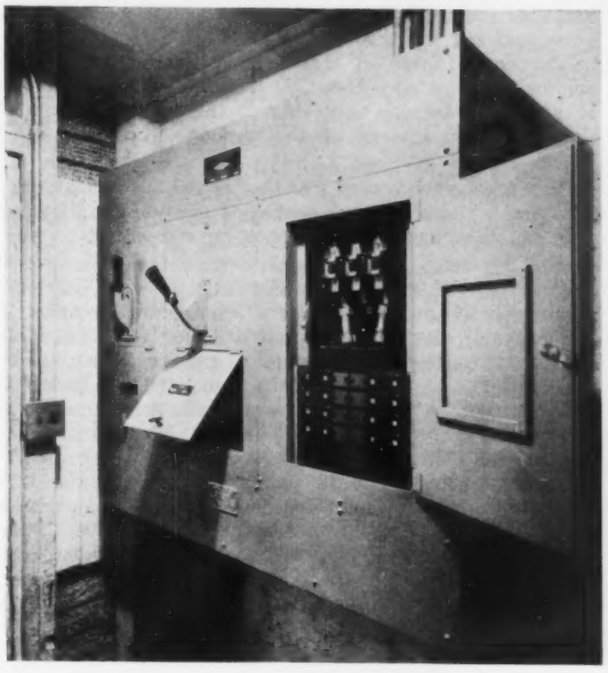


Above — Metering panel and power distribution center with an 18-circuit Convertifuse distribution panel and meters and switches for controlling one-half of the building



Right—Typical 16-circuit lighting distribution panel with No-fuse circuit breakers and remote control switch in mains. Twelve of these panels were installed. Also shown (at right in picture) is a 6-circuit panel for controlling one-half of the colonnade lighting

Below — Sub-distribution panel and high-speed main switch for control of watchman and parking lights



are marked with large, easily readable nameplates, and large directory frames fitted with drawings are featured as a convenience in the control of lighting equipment. The total lighting load is 310 kw. although there is capacity for nearly 450 kw.

The wiring system was carefully calculated to transmit full load on the mains and sub-mains with less than 1 per cent loss. Slightly higher losses were permitted in long branch lighting circuits to save copper, but lamps of 115-volt rating have been selected for fixtures in the main building. A test of the completed installation indicated that service to the last lamp on the longest circuit, with all lights on, was 115 volts, as originally calculated.

All of the installation work was done by the Marine Electric Co., electrical contractors of San Francisco.

It is planned that when the dome structure has been rehabilitated completely, there may be installed approximately 2,000 kw. of flood and fountain lighting to complete the lighting plan.

It is of interest that the Park Commission wanted a high-class lighting system with the best and most modern materials. They maintained their desire in the purchase and ultimate installation of such a system, with the result that the lighting, which delivers an intensity of 45 foot-candles, probably is the best in any exposition building in the United States.

Every person connected with the electrical industry must help to—

Prepare the Public For Rewiring

"Selling, therefore, consists of two parts: first, finding or creating dissatisfaction, and then satisfying the state of dissatisfaction"—*A message from Thales.*

MOTORBOATS are more easily sold to Arabs of the desert than is wiring to an already wired home. Despite all the words spoken and written, the exhortations of wholesalers and manufacturers, the urging of power company executives, the bright ideas of secretaries of associations,—the selling of a householder, or more particularly, his wife, on the idea that he needs more wiring and should pay to have it put in right, is an almost impossible job.

The reason is simple.

Folks are not dissatisfied enough with their wiring. They are too complacent. Lamp cord running all over the place is all right enough. Why spend money on something that doesn't show?

It is true that a woman will yearn for new drapes or for a change of wall paper and put up with the inconveniences of cords as a matter of course. The cartoon on this page illustrates a very amusing attitude of mind, but it likewise illustrates more pointedly than words the very crux of sales resistance for everything electrical. "How can you *put up* with all of these *conveniences?*"

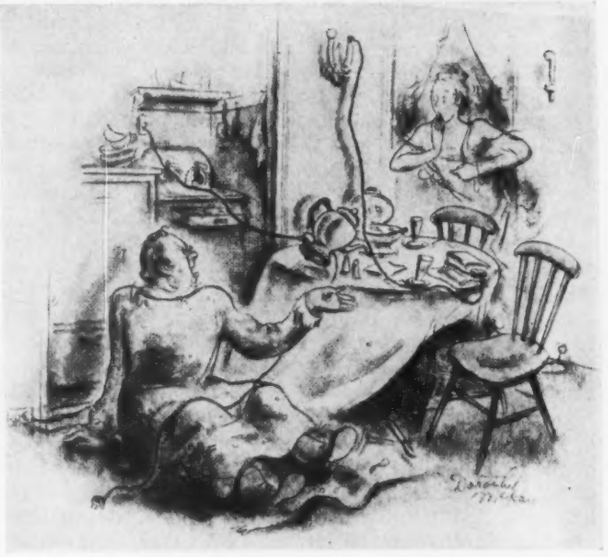
As a result, it is not wiring that gets the dissatisfaction which results from inconvenience, but the appliance itself. Scores of percolators and toasters lie on shelves because it is too much bother to do an extension wiring job all over the house to operate them. Sewing machines are still pedaled by foot because it is inconvenient to find a place to plug them in. In reality there is a dissatisfaction with wiring but it is not recognized as such. The dissatisfaction is being diverted from wiring to the other things which electricity operates.

The problem of interesting people in the rewiring of their premises is one of attracting attention to wiring as the real source of the dissatisfaction. People are not aware that wiring exists, usually. Certainly they are not aware that a makeshift is not as good as a real job. And as for circuit overloading, they are completely ignorant on this very important point. No realization ever reaches a customer that a slow operating table grill has poor wiring to blame for its slowness. Many an electric range has proved a boomerang to sales prospects of entire neighborhoods only because the copper and hence the voltage serving it was inadequate.

How then focus attention on wiring?

Whatever the method, it should be very simple and easy. It should be backed up and used by every person engaged in any phase of the electrical industry. Every wireman, every clerk, every executive, every stenographer and every contractor and his staff should be able and willing to use it.

Arthur Kempston, one of the West's electrical enthusiasts of long standing, has suggested the idea. It is simplicity itself. It is something which every person can and should do at every opportunity.



"Emiline Alicia! How do you put up with all these conveniences?"

Courtesy of LIFE

Wherever you go, at the homes of friends, associates, relatives, acquaintances, and even on business calls, if you see cords running around baseboards and dangling from chandeliers, express surprise with about the following words:

"I'm surprised that you would use cords so. You know there is a real hazard in that."

No more than that. No argument, no discussion as to why it is hazardous or how hazardous it is. An argument will kill its effectiveness. If the person addressed takes up the remark it is best to pass it off with a careless comment, such as not wishing to make a nuisance of oneself by arguing about it, but merely being surprised that it is so.

The entire force of this remark is to awaken consciousness to wiring itself, to cause inquiry regarding it, to draw attention to wiring as the possible source of dissatisfaction instead of the appliance that is served by it.

Only after such a seed planting can the campaigns for rewiring which are being developed everywhere find any sort of acceptance for what they have to offer.

And lest the squeemish central station man may feel that perhaps this emphasis of hazard is wrong, that it is technically not true, that electricity will suffer if people fear it, let it be said that it is far better to create an honest respect for electricity and prevent possible accidents than to try to explain them away on technical grounds after something has happened. And no one will deny that next to flatirons left on, the chief cause of fire and accident with electricity is the misuse of cords and appliances. But there is no need to argue even this point. Central stations have more to gain from homes properly wired than any other interest involved. They must live with the consumers' wants longer, must keep him satisfied longer, must assume all blame for anything that goes wrong whether there is any justification for it or not, and must derive their revenue from unhampered use of electricity by the customer.

Selling wiring adequacy is not a job for a selected few salesmen, Red Seal representatives, contractors or makers of wire. As will be shown in subsequent articles on the wiring problem and its real solution—*selling*—rewiring and original wiring alike depend on and affect everyone in the industry.

The growth of the entire industry must mark time behind the slender copper threads installed in the home, the store, the office or factory. If they continue to remain flimsy and limited carriers of current they will never support the manifold and limitless services the industry is anxious to render the public over them, for the sake of its own livelihood, and right now, survival.

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Red Seal Prize Contest Begins

ADDED stimulus to the Red Seal plan of home wiring in California is to be given this year in the shape of prizes both to contractors and to power company representatives who do the most effective work during the year, according to a broadside announcement just distributed throughout the industry by the Pacific Coast Electrical Bureau. The contest is retroactive to begin April 1, 1932, with the first of three quarterly awards to be made July 1, 1932.

There are two types of prizes awarded each quarter. The first is for contractors. The contractor who makes the highest percentage of homes against his district quota will receive a prize of $25 cash. Six such prizes will be awarded each quarter, one each to the contractor making highest percentage of quota in each of the six major divisions. These six divisions, roughly speaking, are the territories of the following power companies and inclusive surroundings: Pacific Gas and Electric Co., San Joaquin Light & Power Corp., Southern California Edison Co. Ltd., San Diego Consolidated Gas & Electric Co., Coast Counties Gas & Electric Co., and Southern Sierras Power Co.

For the best performance from a utility representative engaged in Red Seal work in percentage of quota during each quarter a prize of $75 will be awarded, with second prize of $50, and $25 to the third highest.

Then for the year the contractor in the entire state and the central station representative in the entire state making the highest percentage of Red Seal homes to quota will receive a $100 prize in cash.

In addition to these prizes for the year, an honor plaque will be awarded to the power company division making the best quarterly showing, and finally at the end of the year it will be awarded the division making the best yearly showing. In addition to this a grandfather clock radio will be given to the district manager whose district makes the best performance for the year.

A point system is arranged for basing the awards. A Red Seal home counts as ten points. In an apartment house installation five apartments are counted as one home, or ten points. Then an additional point is given for each kilowatt of capacity in appliances installed in addition to Red Seal requirements. For example, a 7-kw. range would count seven points, a water heater five points, and each kilowatt of air heating an additional point. Thus it is possible to run up the equivalent of several homes on one residence by selling and installing additional equipment.

Coincident with the announcement of the prize contest the Pacific Coast Electrical Bureau also announced some revisions and additions to the Red Seal residential specifications to bring them in line with modern demands. Among these additions or revisions are:

Additions Made to Specifications

Three-way switches are required in rooms having two entrances more than 10 ft. apart and in all halls over 15 ft. long. Double convenience outlets are counted as single if under a single plate. An exception to the rule for convenience outlets, requiring all on circuits separate from the lighting, in the case of an outlet in a mantle for an electric clock, or an outlet for a clock in the kitchen located at least 7 ft. from the floor. It is felt that since appliances cause most fuse burnouts there is less likelihood of interruption of energy supply to a clock on the lighting circuits than on convenience outlet circuits.

Additions to the number of outlets are made as follows: At least four convenience outlets are required now in a living room, two in each bed room, two in the kitchen and one in each other room including the laundry space. An outlet for a kitchen clock is now required also. If a bathroom heater is installed the convenience outlet is no longer allowed left out in the bathroom, since the general use of sunlamps in bathrooms requires this outlet. A radio outlet with ground and aerial connections is also required for the living room. A range receptacle of 50-amp. capacity is considered equivalent to the range box in the kitchen. A lighting outlet is required also over the kitchen sink.

Published specifications will soon be issued in the revised form and available for distribution from each of the Bureau's three offices.

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Price Cutting Will Not Keep Profits Up

By W. E. Cranston, Jr.
Vice-President, Hoffman Specialty Co.

PRICE cutting is a great fallacy commonly practiced in a "buyers' market." The hope is that a cut price will bring a larger volume of business and thereby keep up the yearly profit.

Profit is the only end which justifies anyone being in and staying in business. The following table shows how much more business must be obtained to equal the same margin of profit, if prices are trimmed. On a 25 per cent margin of profit, a price cut of

5	per cent requires 18 2/3 per cent additional business.
8	per cent requires 35⅛ per cent additional business.
10	per cent requires 50 per cent additional business.
12½	per cent requires 75 per cent additional business.
15	per cent requires 112½ per cent additional business.

So, if you cut prices 15 per cent on a $100 sale, it is necessary to sell $112.50 worth of *additional* business before you can make the profit of $25 to which the original price entitled you. It is necessary to more than double the volume. When there is a limited amount of business, the situation progressively becomes worse.

Building, up to May 1, was only 45 per cent of that for the same period in 1931. Thus, it is well nigh impossible to double one's volume unless it is in a new line of endeavor with greater sales effort.

San Jose finds it best to—

Run Your Own Show

Newspaper-Sponsored Expositions Often Lack Many Advantages of the Industry-Operated Program, Cut to Fit Specific Trade Needs

WHEN a newspaper sponsors an electrical exposition it is only natural to suppose that it is to the interest of that newspaper to do so. Few papers are in reality as big hearted as they pose as being in such community enterprises. While this fact is nothing to worry about, it is true, as the Santa Clara Electrical Development League found out at its own electrical exposition in San Jose, Calif., April 13 to 16, 1932, the interests of the exhibitors do not always coincide with those of the newspaper and require a different method of treatment.

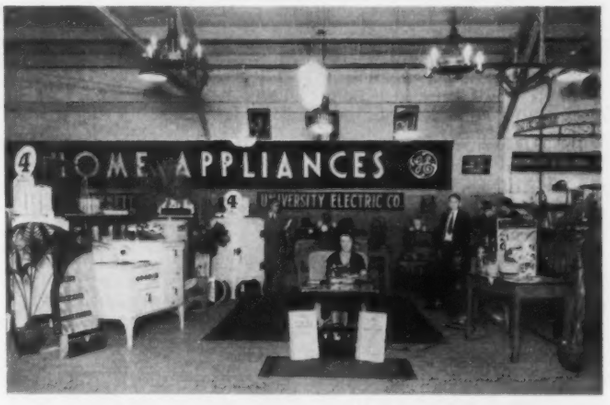
During the last two years newspapers have developed the exposition idea as a very special form of revenue production. They sponsor food shows, auto shows, radio shows, electrical shows, any kind of shows that will yield extra advertising. On the whole, they do an excellent job. In some cases over-zealous advertising men resort to politely coercive methods to insure the success of their enterprise.

The chief disadvantage under which newspapers operate is a lack of knowledge of the financial limits of their advertisers, or any appreciation of the proportion of their budget which they can reasonably expend in show advertising and still stay in business. Hence they often set up a program which requires an expenditure far beyond the ability of the individual dealer exhibitors to pay in advertising or rental fee. Meeting resistance to such uneconomic costs from the exhibitor, they often resort to pressure which sometimes forces the exhibitor into a proposition beyond his depth.

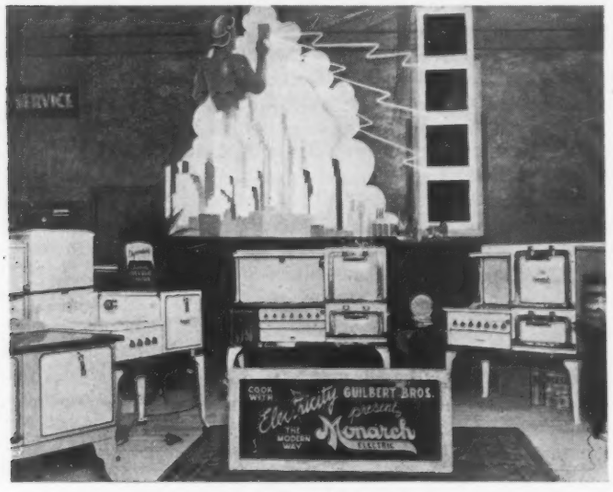
Such cases cause the exhibitor to enter into the show with anything but the enthusiasm he will need to make the affair a success to him. The next time a show of similar nature is proposed the exhibitor is obdurate. So far as he is concerned, the value of shows of this kind from then on has been killed.

The Santa Clara league was approached by a newspaper last winter, urging an electrical show before Christmas. "Fortunately for us," says Roy M. Butcher, president of the league, "they soon demonstrated to us that the thing was not well organized or planned. I feel now that we have been far better off to have waited until spring, and to have put on the show ourselves in our own way."

A show committee was appointed, consisting of George M. Thompson, of The L. H. Bennett Co.; C. A. Rylander, Mission Electric Co.; Orville Johnson, Graybar Electric Co.; William Harvey, Guilbert Bros. Electric Co.; and John C. Ross, Pacific Gas and Electric Co. The committee made an estimate of what the show would cost and, after consultation with him, of what each dealer could afford to take. A hall was selected that would come within the budget. As a result, a charge of $50 per booth or display space of 15x20 ft. was arrived at, and the total cost was estimated at $1,650. O. R. Doerr, of the P. G. and E. general office staff, was asked to direct and plan the arrangements.



The new tiny electric sewing machine, backed by a complete array of appliances, made the University Electric Co. display a center of interest



Neon lightning flashing to the illuminated placards telling of the various services offered by the company, topping a complete display of ranges, made the Guilbert Bros. booth sparkle

When the affair was over there was a small surplus still left in the treasury, after all bills had been paid. A total of 12,739 people had visited the show in the three days and evenings. More than $3,000 in merchandise was sold directly from the floor.

What is more, *all* newspapers in the community featured the exposition rather than only the one which would have had it exclusively under the original plan, and all received ample advertising both from the league and from individual exhibitors.

The total advertising space run was 640 column inches by the league itself, 150 in. by the Northern California Refrigeration Bureau, and 30 in. by P.G. and E. A total of 2,254 column inches of paid and free publicity was obtained by dealers and the league. Other advertising consisted of auto stickers, 20,000 bill stickers on P. G. and E. bills, radio announcements over station KQW through the courtesy of the Pacific Coast Electrical Bureau farm broadcasts, and 600 letters to women's clubs inviting entries to the cake contest.

The program from beginning to end was under the control of the league. A committee consisting of C. A. Rylander, A. Smith, of L. Hart & Sons, and Carol Miller, of Nathan Dohrmann Co., had this in charge and kept it predominantly electrical in its emphasis, what food products or other contributing interests there were be-

The path of the curious, attracted by an "electric eye" at the rear of the General Vacuum & Washer Co. display was through a line of washers in operation and a new flat-plate ironer in action

ing fitted into the electrical idea. The prize committee, which provided 140 prizes of various kinds, consisted of Orville Johnson; Bruce Brownlea, of Westinghouse Supply Co.; K. E. Campbell, of The Electric Corp.; and D. V. Tuttle, Jr., of G. E. Supply Corp. An invitation committee was selected, headed by George Thompson and assisted by W. R. Bowler, of the P. G. and E. Co., secretary of the league.

Some of the stunt features which made good publicity were the baking contest, with a subsequent sale of the cakes for the benefit of the Home of Benevolence, a local charity; a pigeon flight to Oakland, in which the mayor of San Jose invited the mayor of Oakland to attend; a demonstration of the "electric eye" at two of the displays; the Westinghouse robot; lapel microphones worn by the demonstrators and connected to the public address system; a men's biscuit baking contest, and other features. The Western Electric public address system was furnished through Orville Johnson by the Graybar Co., and operated by Mr. Johnson. Roy Butcher installed the speaking and amplifying equipment.

An interesting phase of the affair was the grand prize. Instead of determining specifically upon one appliance, choice of any appliance of the value of $175 was given the winner. The winner selected a Kitchen Aid. The winner of the cake baking contest, entitled to a $100 appliance, chose a washing machine. These are interesting indices of the desire for such appliances at this time. Another interesting summary is that of floor sales. There were sold from the floor, two ironers, three mixers, four refrigerators, two ranges, two vacuum cleaners, six washers and one water heater. Sales immediately following the show and directly attributable to it included

Motor repair shop mysteries of winding and repairing motors were demonstrated to interested hundreds at the Meade Motor Works booth

two refrigerators, two radios, one sunlamp and an automatic toaster.

This type of exposition gives an opportunity for one display of extreme value to the industry seldom shown in such affairs, namely wiring. Roy Butcher, doing a contracting business exclusively, had an exhibit of real interest. He featured the "electric eye," or photoelectric cell as a means of starting appliances, flashing pilot lights or turning on a floodlight. Attention was called to a group of convenience outlet finish plates of attractive design. Selection of which particular device the "eye" was to operate was made by plugging into the correct outlet on this display board. The pilot light bullseye and switch attracted a great deal of attention, many people expressing a desire for such indicators on basement lights, garage lights, etc.

Several varieties of push-button assemblies were shown, as well as several kinds of intercommunicating phones. A special attraction to children was a play telephone set which actually worked. Doorbell chimes and dinner chimes were another feature. A flush mounting box for concealed mounting of the telephone bell box, and flush mounted buzzers and annunciators were also surprises to the public. A neat display of hospital call system apparatus likewise attracted. Large display boards showed metal molding fittings for making additions to interior wiring in a safe and permanent fashion. A new Latox or extra pliable and rugged twin cord was also displayed. Meter entrance assemblies, small breakers for protecting motor equipment, finish materials for interior wiring, both metal and rubber range plugs and receptacles, the circuit breaker load center box, and numerous other visible evidences of the usually invisible wiring made a selling display of wiring that should prove unusually effective elsewhere.

Next year, Mr. Butcher declares, the city inspector also plans to exhibit, with displays designed to show the need for adequate wiring, proper fusing and safety precautions. This will constitute the selling of inspection and the value of a code, a step comparable with preventative medicine.

Another unusual display was that of the Meade Motor Works, which had a motor winding shop in operation at the show. This attracted much attention and helped to create more respect for the care and precision with which electric motors are built. This exhibit, like the mechanical models of refrigerator mechanisms and the like, had the feature of action to attract crowds.

Whatever else may be of especial benefit to the electrical industry may also find its place in the program

A niche featuring a range and kitchen lighting unit, ranges and a dairy sterilizing unit made up the utility's exhibit. The utility also cooperated by furnishing home demonstrators and provided capable supervision for the exposition

of the electrical show run by the electrical industy cooperatively. The only danger in such a plan is that a show operated by the industry may not always have a good outside viewpoint. With the proper cooperation of newspapers and the help of showmen, both inside and outside the industry, this danger can be eliminated.

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Utility Merchandising Still on Trial By Dealers

The Ghost of Merchandising Prohibition Still Lingers; Meanwhile a Municipality Starts a New Plan of Interest

LET no one in smug self-satisfaction contend that anti-utility merchandising measures are dead. Few legislatures in the West meet until next year, and thus the time between now and political action seems far away. Yet there is an election this fall and initiative petitions are admissible then for public ballot. A light and power industry which has several times been attacked by government ownership movements at such times should recognize the significance of such a possibility and recheck its cooperative works to see whether or not they are producing the cooperation they so earnestly seek, that of the dealers.

A continuance of stringent economic conditions has kept the many and almost universal movements to increase the benefits of power company sales effort on behalf of dealers from a full measure of success. Neither power companies nor dealers have received much tangible benefit from the revision of sales plans to protect the dealers' interests. Nearly every company has reviewed its program and made important changes to render it more effective for dealer benefit. But as days pass and sales have not immediately resulted, there is danger of once again forcing too strongly the company sales drive at the expense of dealers.

If ever a critical time existed for cooperation to be tested, this is that time.

Observations of the editors of ELECTRICAL WEST in the field have led to a real concern over the prospects for the next few months. There are rumors of an initiative petition sponsored by merchants of California to place the issue before the people at the November election. Of course the hue and cry would be based on the "monopoly" scare, which worked so effectively in an issue dodging fight on the oil conservation and production control measure in California at the recent primary elections.

Even from British Columbia comes word of a complaint lodged against the utility company because of alleged "unfair competition," the complaint being made to the public works committee of the city council of Victoria. In Arizona a new plan is being tried out which promises better relations. In Nevada there are rumbles of another attempt to have the legislature pass a restricting bill. In Oregon the utility commissioner has already divorced the accounting of power company merchandising from operations.

Dealer feeling still runs deeply on competitive practices. ELECTRICAL WEST has long held that the problem is chiefly personal and human. Despite much theoretical and head-office redesigning of sales plans there has not yet been sufficient enthusiasm and personal effort expended in many local districts to make the cooperative plans really work. The problem is even more human and personal now than a year ago. Head-office policy alone will not take the place of a few personal calls and a little tangible evidence of cooperation in the form of some business right on the home grounds.

ALAMEDA STARTS WIRING PLAN

As another cooperative idea which will be interesting to see developed, the municipal plant of the City of Alameda, Calif., selling no merchandise itself, has inaugurated a plan to stimulate load building by dealers. The plan practically consists of removing the one big sales obstacle, wiring.

It is a new plan for the installation of electric ranges, storage-type water heaters or air heating equipment in Alameda, Calif., and was placed in effect by the Board of Public Utilities Feb. 9, 1932. Wiring installation is rotated among the local electrical contractors and becomes the property of the Board of Public Utilities. The terms of the arrangement which reveal all of the essential details of the plan follow:

"1. The title to all such wiring and equipment shall remain in the Board of Public Utilities, and the Board shall have the right to go upon the premises at any reasonable time to install, renew, repair or remove same.

"2. The cost to the Board of Public Utilities of such wiring and equipment shall in no case exceed $40 per range, $25 per water heater, and $60 for range and water heater. Where, due to low foundations or other unusual conditions, the estimated cost of the installation exceeds the above allowances by $5 or over, the applicant may be required to pay said Board the amount of such excess cost, in advance.

"3. The applicant must sign a contract to own and operate such electrical equipment, or similar equipment of equal capacity, for a period of two years, subject to rate, or rates, and minimum charges effective and applicable to such service.

"4. The Board of Public Utilities will furnish and install all wiring and equipment necessary to supply electric service for air heating equipment of 2 kw. or over, provided the applicant will deposit in advance with the Board an amount equal to the estimated cost of such in-

stallation. The Board of Public Utilities will refund to the undersigned the sum so advanced by him without interest, according to the following provisions, but in no case will the total refund to him exceed the total sum so advanced by him, nor shall any refunds be made hereunder for any revenue received as hereinafter provided after the expiration of two years from the date of completion of the installation of the wiring and equipment hereunder.

"Refunds equivalent to 50 per cent of the gross revenue received by the Board of Public Utilities from the sale of electric energy to supply the load hereinabove noted, or any addition thereto, will be made to the undersigned applicant once each month on the regular billing date for such service; provided, however, no such refund shall be made hereunder on account of lighting service or any other service metered in conjunction with the heating load.

"5. The above regulations for furnishing wiring and equipment for furnishing electric service shall not apply where any equipment is to be operated on any special flat rate, or any off-peak rate now in effect or which may hereafter be in effect."

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Used Appliances for Small Allowances

FOLLOWING the lead of used-car merchants, the B. C. Electric Railway Co. has opened a used appliance market in Vancouver in order to enable patrons to purchase used electrical appliances and radios that have been thoroughly reconditioned and appliances that have been used for demonstrations. These are sold at low prices which allow many persons to buy who otherwise would not be in the market.

This new merchandising practice enables customers to buy used appliances at prices they know are right and at the same time be assured of 100 per cent service and satisfaction, for every article carries a full 90-day

guarantee. So well are they refinished that they are hard to distinguish from new products.

Large furniture dealers in Vancouver installed used furniture departments last year and met with signal success, and the used appliance store has been doing a brisk business so far. G. Pearson, manager of the store, attributes the success to several factors: It gives the public assurance of a fair selling price for any old appliance they might wish to buy; it offers to those wishing the convenience of a modern electrical appliance a guaranteed, reconditioned product at a considerable saving; it offers an outlet for valuable appliances which might otherwise be junked for lack of proper marketing facilities; and it allows customers to secure substantial discounts through trade-ins.

This practice also increases the load on the central station's lines. Because of present conditions, the psychology of the venture seems to have played a feature role in its success.

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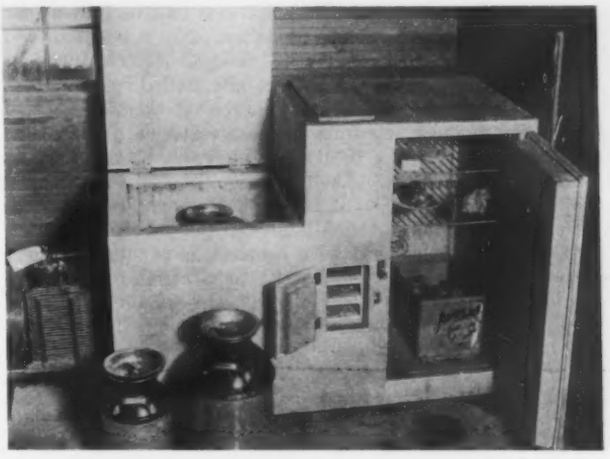
For Home And Dairy



A COMBINATION household and dairy refrigerator box capable of meeting the needs of a small dairy and for ordinary household use has been developed by F. E. Price, project supervisor, Oregon Committee on the Relation of Electricity to Agriculture, Corvallis. This device, which has a tank-type compartment for refrigerating cream and a dry box compartment of 12 cu.ft. capacity for food storage, is refrigerated by a standard 1/3-hp. Frigidaire compressor and cooling unit. The tank compartment will hold 25 gal. of cream in 5 or 10-gal. cans.

The box is in one unit with the two compartments on either side of a 30-gal. brine tank, into which is built a compartment for freezing ice cubes. It is constructed of 18-gage metal with 3 in. of cork insulation.

The box was designed to meet the needs of a small dairy farm, so as to permit the securing of a 3c. to. 5c. per pound premium for sweet cream, and at the same time to provide refrigeration service for the household, at a cost only slightly exceeding the cost of either one of the two units separately as these are now being marketed. Several of these boxes were made for experimental purposes; the one shown has been giving service on a farm near Corvallis for over a year.

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BUDGET PLAN MERCHANDISING by the Hudson's Bay Company at their Vancouver, B. C., store has now been extended to include some lines of electrical appliances. In a nutshell, the customer under this plan selects any of a distinct group of appliances, has the prices totaled and then pays 10 per cent cash, and the balance in nine monthly payments.

Follow Through

Take a Tip From the Insurance Agent —Most of His Business Comes From Old Customers Because He Keeps Selling Them Everything They Need

By CARLTON SCHEINERT

MRS. FRASER has just bought a new electric washer. No, it was *not* sold to her, she *bought* it. Deciding in her mind that she wanted one, she called the nearest dealer and had one sent to her home on trial. She also has an old model electric iron, a percolator, a battery-run radio and a few other electric appliances, each a lead-in for the sale of others. Each was bought from a different dealer!

Behind the door is the faithful carpet sweeper. Some day she will replace that with an electric vacuum cleaner.

Her neighbor, Mrs. Lee, went to town the other day and looked over some electric irons. She made her selection, the salesman took her money, wrapped the iron, and undoubtedly was glad to make the sale. But did he inquire as to what else Mrs. Lee might be able to use in the line of electrical goods and show her something new? Did he take her name and address, to try to hold her future business to that store?

Mrs. Fraser and Mrs. Lee are typical examples of the buyers of modern electrical home equipment. They present an opened-up, ready market. But from the dealer's viewpoint, why should Mrs. Frazer buy one piece here, another down the street, when she would be as well satisfied—perhaps better—if she dealt entirely with one dealer? Why isn't this business held by some one electrical dealer instead of spread so thinly?

The other day the dealer from whom Mrs. Frazer bought her washer came to see her, to make sure that the machine was giving satisfaction, that it was a "sale" now. The battery-run radio was going and she was cleaning the floors with the carpet sweeper. Did he see anything, say anything about radios or vacuum cleaners? Both are in his store. No. He asked how the washer was working, and when assured that it was satisfactory, went away smiling. Yet he could have put in a wedge for that future sale of a vacuum, made himself the supplier of electrical equipment and service for that home.

You usually seek the services of one doctor when sickness makes a call. There is just one lawyer who handles your legal business. And usually there is but one insurance agent who is taking care of any and all of your needs in that line. Sometimes, for business reasons, there may be two. If so, isn't each trying to get it all?

Take a tip from your insurance agent. (Notice how natural that "your" fits in with "insurance agent"? Why not become *your* electrical dealer instead of *an* electrical dealer to customers?) Your insurance agent knows the various lines he is selling, knows what you can use to advantage, and is not bashful about coming after you with suggestions. Buy a new car and see how quickly he is at the store. He knows of the sale almost as soon as the car dealer. A dealer knows his lines, knows what pieces of electrical equipment the householder can use to advantage. But does he keep telling them? And does he know *who* his customers are?

The biggest asset the insurance agent has is his "customers' file." Here are listed the names and addresses of all his policy holders, with notes as to what insurance they now have with him, when it was written, when it expires (so that it may be renewed at once), what other coverages could profitably be used, and what policies, if any, are in the hands of other agents. *The biggest percentage of an insurance agent's business is sold to his present customers.* He offers a real sales argument in the fact that if you spread your buying you cannot expect the service that you would get if you concentrated your business.

The dealer from whom Mr. Frazer bought her washer could have entered her name and address in a "customers' file" with the notation of the sale of the washer. When he called and saw the old radio and the carpet sweeper, he could have pleasantly inquired as to what other electrical equipment Mrs. Frazer owned, easily learning its condition, possible need of replacement, and what new pieces could be used with profit. This would have come easily, now that friendly relations had been established because of the sale of the washer. Back in the store, all this data would have gone on that record card, for Mrs. Frazer is now a real sales prospect for future new equipment.

From time to time he would make a sales effort to replace the radio, put in a vacuum, and add new pieces. Because of his attention and service Mrs. Frazer would have become thoroughly his customer. As it stands, (I know) Mrs. Frazer will buy her vacuum from another dealer, possibly without any sales effort on his part, even as she bought the washer. She will buy a new radio—from another. Replace that old iron—from still another. Not purposely, of course, but it will "just happen" that way . . . and you know how often!

The point is this: If Mrs. Frazer does not buy her radio, her new vacuum, her iron, and other pieces from the dealer who now has the "inside" because of the washer installation, it is his fault. Just as it would be your insurance agent's fault if you should buy your next policy from some other agent. You are a free agent, able to buy from whom you please, as is Mrs. Frazer, but your inclination is to buy from "your" agent. He blames himself if you do not think of him first. Do you blame yourself if any of your customers buy at some other dealer's the same things you sell?

If the salesman who wrapped Mrs. Lee's iron had secured her name and address, this would have started a new card in the "customers' file." A follow-up to the home would have added information as to other equipment owned, and as to what was desired as the next piece. Attention could be called to something new, interesting and informational. The data would have been

entered on the card for future sales effort, and there is little doubt but that Mrs. Lee would become a consistent customer instead of a transient.

Sometimes it is a good thing to learn something new; take a tip from those who are working a different line than we, perhaps with a different set of ideas. Listen to your agent canvass you for a new line of insurance; let it be suggestive. Adopt his idea of a customers' file and use it on all sales, small or large, cash or credit. He will tell you that 60 to 70 per cent of his business *is from those already sold once.* It's follow through and keep them with you!

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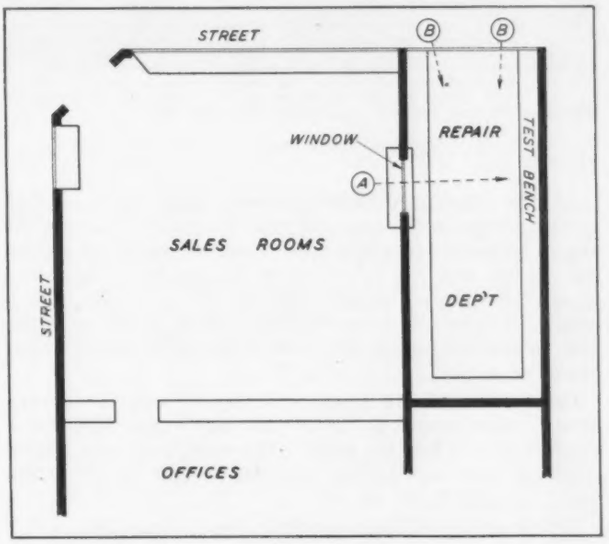
Take the Mystery Out of Repairs

TREMENDOUS advertising possibilities lie in the repair shop of an electrical concern, believes Sam A. Cramer, manager of the Cramer Electric Co., Los Angeles. So firm is he in this belief that he has remodeled his store so that the repair department may have an up-front location.

This arrangement gives the department frontage on the street, the same as the sales division, so that patrons on the sidewalk may look through the windows and see the equipment, machinery and the mechanics at work.

Cut into the wall separating the repair shop from the sales room is a wide window above a counter, giving those in the sales department a view of the repairmen. A customer who has brought in an appliance for repairs may watch the electricians test the appliance and repair it, and may himself ascertain its condition. The firm specializes in vacuum cleaner sales and service, so most of the appliances brought in are of this kind.

"The test bench, with its numerous dials, meters and all is directly across the room from the customer and facing him," Mr. Cramer explained. "Therefore he can see what is going on and need not take the electrician's word alone as proof that the appliance needs certain things done to it. He can see they are needed.



Under the present plan, customer A is able to stand in front of a window and watch the repairman work on his appliance. Customers B, outside, are able to watch the work from the street window

"That is one of the bad features of having the repair department at the rear of the establishment—customers usually are not permitted to enter the shop. An electrician just takes the appliance and disappears; pretty soon he reappears and tells the customer what must be done. The customer has no proof that the electrician is not exaggerating the condition and that he does not suggest repairs really unnecessary. In other words, an up-front repair department takes the mystery out of the electrical repair business.

"A further advantage in this arrangement is cleanliness. It is certain that, because of its location where all who pass and all who enter the store may view it, the repair department must be kept clean and orderly. The old department was dark and dirty; the boys had to work under artificial light practically all of the time. With windows at the front and a skylight overhead we will have natural daylight all of the time, with increased production.

"Each electrician's section is equipped with a swinging seat which he may use if he desires; when he does not need it, it swings back under the bench out of the way. We supply each worker with a sponge-rubber mat to stand upon. It is surprising how restful this is; and I am certain that in addition to gaining much advertising from the newly located repair department, we are increasing production by 25 per cent.

"With a shop of our sort we must depend largely upon location and 'at-the-shop' advertising to get business. Los Angeles is too large to capitalize newspaper advertising adequately, though we do some in the classified columns."

The "at-the-shop" advertising consists of adequate window display and building signs. The shop is on a corner and the main entrance is in the corner of the building. Over the entrance is a rack on which are several real vacuum cleaners; not dummies. And they can be seen for some distance down the street. At intervals along the front are pedestals on the sidewalk, backing against the building, and each pedestal supports a cleaner.

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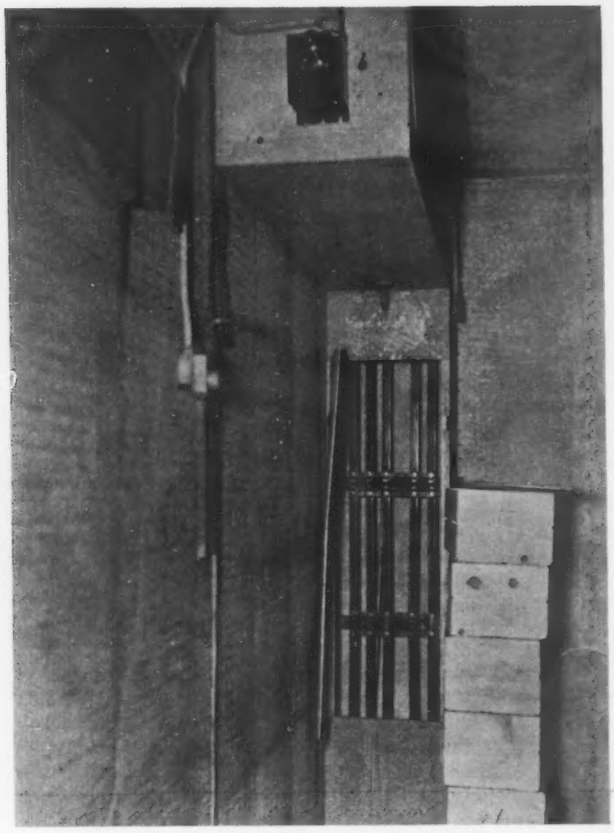
Keep Your Stock Moving —If Only in the Store

"IF YOU do not keep changing things around in your store and in your windows," says Harold N. Jackson, of the Jackson Electric Co., Monrovia, Calif., "the public will think that your stock is old. It makes no difference how new the item is, if it is placed in the position formerly occupied by a similar item, the public thinks it the old item unsold. For that reason we shift our one electric washer here and there on the sales floor. If we sold it and brought another just like it from the warehouse and placed the new washer in the same place as the old, our customers would pass it up, thinking it was the old washer and was unpopular because it hadn't been sold.

"Our in-the-store displays are in the process of continual change. Even our window displays must be altered continuously, for many people seem to think that all of the merchandise a dealer carries is that shown in the windows.

"We go in strong for novelties as a means of sustaining our sales volume. These are scattered over the sales floor to catch the eye of the visitor regardless of where he may be in the store. However, we try to keep novelty lamps, some lighted, in the rear so that visitors will be drawn to the back and notice other merchandise en route."



Ceiling fan and connecting strip heaters at the American Fruit Growers plant. Note that heaters are enclosed in a duct, front of which has been thrown open for view of units

Sweating Oranges With Electric Heat

HUMIDITY, as well as air circulation and heating, seems to be required in the sweating of oranges, the artificial ripening process to which much of the fruit now is being subjected before packing. Attention was first directed to this necessity during the fruit fly epidemic, when it was found that higher temperatures were needed for sterilization of the fruit or else the humidity must be raised to produce the same effects.

A very successful application of this principle was developed by Robert H. Mohler, of Pasadena, Calif., for packing plants in the vicinity of Riverside. The temperature is maintained at 85 deg. with a 95-deg. humidity in this application, combining a water heater of the immersion type placed at one end of an open tank so as to generate water vapor and allow it to enter a duct where it is brought in contact with electric strip heating elements and then forced by means of a ventilating fan from the ceiling of the room to the sweat room packed with crates of oranges. The water heater element is a 5-kw. immersion type element. The water tank is provided with a float valve which allows more water to enter after evaporation has lowered the level of the surface. Strip heaters are 500-watt size arranged in a bank of sixteen strips, consuming from 6 to 8 kw. and operating at black heat.

The sweating process requires an installation which will meet the two extremes produced by summer or winter conditions. In the summer, with relatively high outside temperatures and low humidity one condition must be faced. In the winter, with low outside temperature and high humidity another condition must be met. For the summer the humidity is all that is necessary to add to the system. For winter both heating and humidity must be provided. On account of the very combustible nature of ethylene gas, no open flame heating can be used in such sweat rooms. The installation mentioned is at the American Fruit Growers' packing plant near Riverside. Typical construction details are shown in the accompanying diagram. The heaters are operated by a Mercoid switch which breaks 20 amp. at 220 volts. Thus the heating bank is made up of two 4-kw. units, each controlled by one of these switches. Such an installation obviates the necessity of a relay.

The ordinary summer humidifying is done by means of spraying with water the canvass ducts through which the air passes before reaching the fan. In the winter time, since the vaporization of water will reduce the temperature, the auxiliary open-top boiler is used. With this it is possible to get 100 per cent humidity, which is found to be too high as condensation on the fruit results.

A comparison of costs for heating sweat rooms with fuel and electricity has been compiled by W. R. Chawner, of The Southern Sierras Power Co., and is presented in the following. In this comparison various forms of heating in different types of plants throughout California are considered.

COMPARISON OF COSTS

Heating Sweat Rooms With Fuel and Electricity

Oil @ 3c gal. (138,000 B.t.u.)	1.38 mills per box
Oil @ 5c. gal. (usual cost)	2.30 mills per box
Gas @ 40c per M (1,100 B.t.u.)	2.30 mills per box
Electricity @ 1.6c. kw.-hr. (3,412 B.t.u.)	2.45 mills per box

1.38 mills per box at Orosi Foothill Groves, with Celotex rooms and recirculation fans, cost figured by plant manager.

2.45 mills per box at Richgrove-Jasmine Assn. Celotex rooms and recirculation fans.

Indicates nearly equal costs for electric, gas and oil on fuel cost only, providing gas is obtainable at 40c. and oil at 5c.

The oil-fired installation at Orosi costs $3,000 for five rooms. Gas would be about equal. Electric installation estimate for like job —$1,000.

Maintenance on gas or oil-fired equipment with steam or hot water much higher than that on electric equipment.

Cost per box at Richgrove figured by research department, California Fruit Growers Exchange. These tests were conducted during the winter sweating months in Tulare County with average outside temperature of 46 deg. In sweating Valencias during the summer in southern California, the temperature averages around 68 deg. This difference in temperature will make a considerable difference in cost per box regardless of fuel used.

At the American Fruit Growers plant in Corona, a cost analysis of the electric method was made. As far as can be judged it would appear that in sweating a room containing, say, 930 boxes, about 37 kw.-hr. of heat will be used for the boiler and 113 kw.-hr. in dry heat, or a total of 150 kw.-hr. over the total sweating period. The heat is applied during the first 36 hours of the 72-hour sweating period.

On a basis of six rooms and twelve sweats in each period, there would be 72 sweats each six months, or a total of 21,600 kw.-hr. used. The total sweating period is about four months, so that the average monthly demand is about 5,400 kw.-hr.

Based on the existing schedule, the cost would be:

5,000 kw.-hr.	$91.75
400 kw.-hr.	6.40
5,400 kw. hr.	98.15

The total cost for the year will be $392.60, or an average rate of less than 1.9c.

The minimum charge, with six rooms at 6 kw. per room, is $162 per year. On a basis of 900 boxes to the room and a maximum of 144 sweats per year, this amounts to 129,600 boxes sweated per year at a cost of approximately 3 mills per box.

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Fully Refrigerated

SILVERTON, Colo., headquarters of the Silverton Electric Light Co., has been cut off from the rest of the world since Feb. 15 by snow and ice that blocked highways and railroad right-of-way. Food, mail and other necessities have been packed in by men on snowshoes to the two-mile-high community situated among the San Juan Mountains.

This explains why the Rocky Mountain Division of the National Electric Light Assn. is not functioning 100 per cent in the National Refrigeration Campaign. L. W. Purcell, manager of the Silverton Electric Light Co., feels that his customers have been sufficiently "refrigerated." Moreover, he asks of George E. Lewis, N.E.L.A. division director, how would he import an electric ice box if a customer thawed out sufficiently to buy one? A ton of hay was recently parcel posted from Denver to starving Silverton cows and delivered by burro; but Mr. Purcell feels that such transportation methods applied to ice machines might not prove satisfactory.

Silverton, Colo., became a natural refrigerator, without benefit of electricity, soon after this picture was taken

Mr. Lewis reports that all member companies in his district, save Silverton, are actively participating in the refrigeration campaign. He believes this to be a record for complete organization on the activity.

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Making Education A Light Subject

BLANDING, Utah, is 150 miles from the nearest railroad, so the new Blanding High School is probably that school in the United States which is farthest removed from a railroad. But that does not keep the Blanding citizens from being up to date, for they recently spent approximately $3,500 to install proper lighting equipment in the new building.

Blanding receives only daytime electric service, the lights being turned on at 6 o'clock in the morning and turned off at 10 o'clock at night. Realizing that the High School would require full 24-hr. service, the E. H. Eardley Electric Co., of Salt Lake City, was called in to install a complete lighting system in the building.

One hundred and fifty miles overland a $2,000 self-contained power plant was shipped by truck, together with the fixtures and other equipment for modernizing the school. Thirty days later the new plant with its complete lighting system was ready for use. On the night of the first test the entire population of the town, about 900 people, turned out to see the spectacle.

"The Blanding High School is now as completely equipped and up to date as any high school in the less remote parts of the country," says L. R. Berbidge, representative of the Eardley company, who was in Blanding directing the installation. "The plant installed is a 10-kw. system with automatic control. The moment any light in the building is turned on, the plant is in operation, and when every light has been turned off, the plant automatically stops."

With the only 24-hr. lighting service in the entire community, the new high school building has now become the center of activity for the countryside.

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Getting the Most Out of Statements

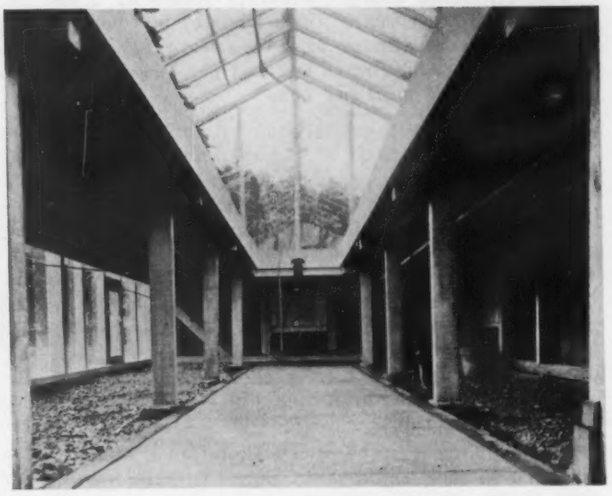
TO help its dealers sell appliances and add good load to the lines, the Puget Sound Power and Light Co. uses a message, in color, on its regular monthly statements. Advocating to its customers the practice of "getting the most out of electricity," the company evidently believes also in "getting the most out of statements."

TO PUGET SOUND POWER & LIGHT COMPANY (CENTRAL DISTRICT) DR.
CASHIER'S STUB
PUGET SOUND POWER & LIGHT COMPANY (CENTRAL DISTRICT)
METER READINGS
STATEMENT OF ACCOUNT
SEE YOUR APPLIANCE DEALER
FOR ELECTRICAL EQUIPMENT
Get the most out of Electricity
ELECTRICAL EQUIPMENT IS NOW BETTER AND CHEAPER THAN EVER! ELECTRICITY IS YOUR MOST RELIABLE SERVANT, YOUR BEST MONEY-SAVER.
PAYMENT ACCEPTED AT ANY OFFICE OF COMPANY (SEE REVERSE SIDE)
THIS BILL IS NOW DUE: PLEASE PAY IT WITHIN TEN DAYS
DATE RENDERED
IF PAID BY CHECK KINDLY SEND IN THIS STUB
IF PAID IN PERSON PLEASE BRING THE BILL

Heating Greenhouses By Induction

Not the Final Step, but a Definite Jump Forward Is the Work Just Concluded by the Authors and Recounted Here

By G. H. HAWLEY AND M. R. ARMSTRONG
Industrial Heating Engineers, Southern California Edison Co. Ltd.



Looking down the central aisle in the greenhouse, showing the conduit under the tables

INVESTIGATION of the heating of single a.c. conductors when encased in steel conduit has led to the commercial adaptation of the idea for use in heating greenhouses. At the suggestion of Frank R. Short, electrical inspector of the California Industrial Accident Commission, tests were made in the test department of the Southern California Edison Co. Ltd. to determine what the heating effect amounted to.

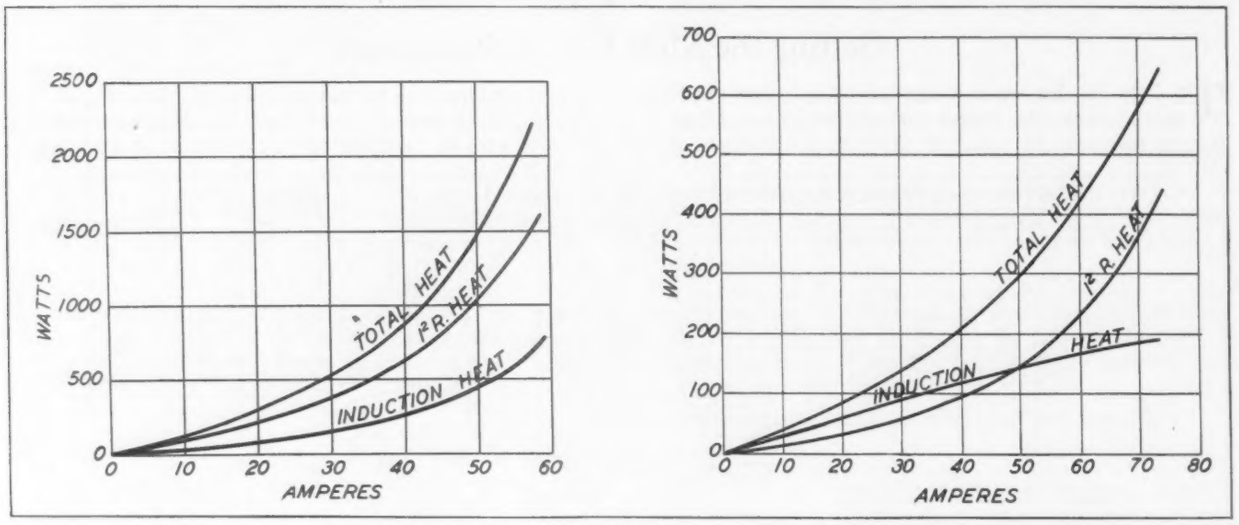
In heating greenhouses it is necessary to have a form of heating element that will be completely waterproof, as any element will be subjected to heavy drip from the benches during the wetting-down periods. Another characteristic of the heating element should be that it would permit operation at fairly low temperatures and provide a large heating area. In other words, the heat should be "spread out" rather than concentrated. Spreading out of the heat gives complete coverage of the areas to be heated, resulting in uniform temperature throughout the greenhouse, while a low temperature gradient prevents violent circulation of the air and the consequent higher heat losses through the glass than when the air is kept from circulating.

In consideration of these facts it seemed that heating by means of wires encased in conduit would provide a very efficient and waterproof arrangement. Its similarity to steam or hot water heating methods with which greenhouse men are all familiar also seemed to guarantee it popular acceptance.

The heating effect that occurs when a single a.c. conductor is encased in steel conduit long has been known. Excessive heating of the conduit is the result of two effects: Eddy currents induced in the conduit by the interlinkage of alternating flux, and hysteresis losses from alternate magnetism of the iron. In making tests, no attempt was made to segregate these two factors, as both may be grouped and classed simply as the additional heat due to induction. The total heating effect is then composed of the I^2R loss in the conductor plus the heat resulting from induction in the conduit. The curves in Figs. 1 and 1a give results of tests made with No. 12 asbestos-covered copper wire encased in ½-in. steel tubes. The curves show the proportion of heat generated by the resistance of the wire and the inductive effect in the conduit for various current values. It was believed at first that the power factor of such a system would be quite low, but tests showed that values around 90 per cent will be obtained in practice. This is due probably to the fact

Fig. 1. Proportion of induction heat to total heat, with 30 ft. of No. 12 copper wire in ½-in. electric metallic tubing

Fig. 1a. Proportion of induction heat to total heat, with 106 ft. of No. 14 copper wire in ½-in. standard conduit



that very few ampere-turns are used to excite the iron, and therefore the magnetizing current is small.

Spurred on by the results obtained in the tests with copper wire, an actual installation was made in a small greenhouse near Pasadena. In this case No. 12 Monel wire in ½-in. electric metallic tubing was used as it was desired to cut down the number of feet of circuit required so as not to crowd the space available for the heating system. One circuit consisting of 158 ft. of wire and conduit was connected to the 220-volt supply taking 5.9 kw., or an energy dissipation of 37.5 watts per foot. At this rating the temperature of the surface of the conduit came to 240 deg. F. when the air temperature was 75 deg. F. The greenhouse is 9 ft. wide by 20 ft. long and 8 ft. to the ridge. Arrangement of the conduit heating element is shown in the accompanying photograph. The initial cost of this installation, including thermostatic control, was only about one-half that for an equivalent steam or hot water heating system.

From the results of these tests an empirical curve shown in Fig. 2 has been calculated. This shows the number of feet of wire and conduit circuit to connect across 110-volt, 50-cycle supply in order to give any desired rating in watts per foot of conduit. The number

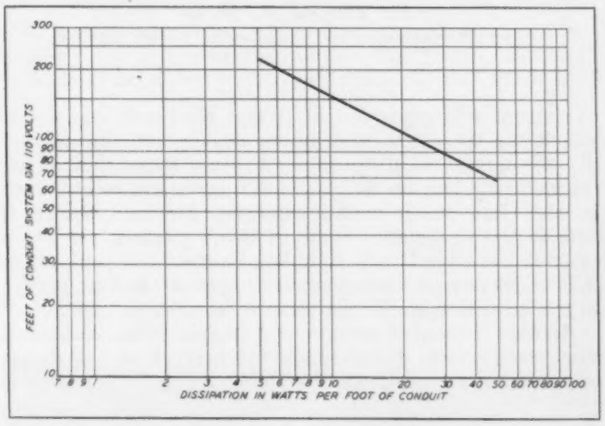


Fig. 2. Logarithmic curve plotted from data for No. 12 Monel wire in ½-in. electric metallic tubing

of feet multiplied by the rating then gives the total watts in the circuit. In general, a rating of from 25 to 40 watts per foot is recommended for the greenhouse and general air heating work. Higher ratings would be desirable in case the conduit was buried in the soil for propagation work.

During December and January some observations were made to determine the consumption of energy required to keep the temperature of the house at a minimum of 54 deg. F. From the results it appears that about two-tenths of a watt per square foot of glass area per degree temperature difference is required to heat the house. This seems to be a safe average figure. On still nights the figure dropped to 0.15 watts per square foot per degree and on very windy nights it rose as high as 0.3 watts. Since the greatest heat loss from the house occurs through the glass, it is sufficient, for all practical purposes, to multiply the glass area of any house by the figure given to find the amount of energy per hour required for heating.

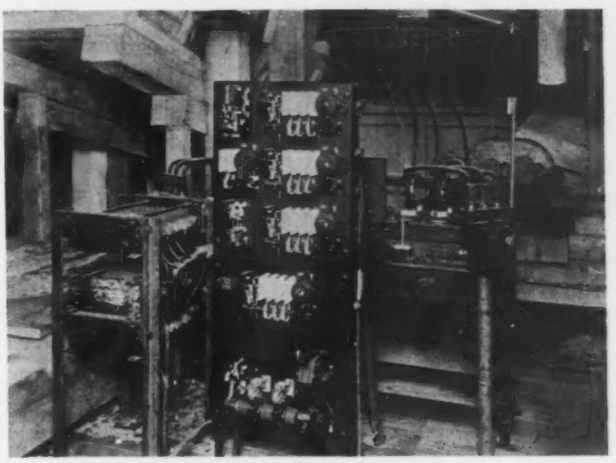
The foregoing is offered simply as a report of tests made in conjunction with this installation, and not as a complete investigation of the merits of electric greenhouse heating. No doubt other installations of this character will follow and an exchange of information would prove desirable.

Modernization Solves Industrial Problem

AT the time when capital expenditure is foreordained to meet with a hostile reception from the management, a bold attack and a successful solution of an industrial economic problem are particularly gratifying. Illustrating the feasibility of meeting the present keen competition by modernizing production equipment is the recent application of a double motor drive for the main head-saw of the White River Lumber Co., at Enumclaw, Wash.

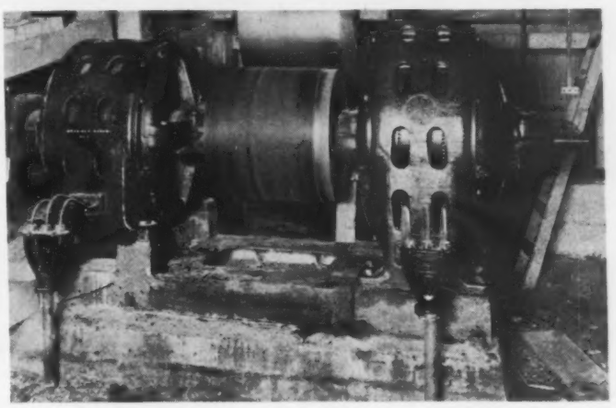
Practically all head-saws are driven at a constant speed, either being belted to a wound-rotor induction motor or direct-connected to a synchronous motor with high torque characteristics. A constant-speed drive is highly desirable for cutting any given grade of lumber, but with frozen or close grain logs the saw will not cut straight and true unless the cutting speed is materially reduced to another constant speed.

In this mill the head-saw had been operated for several years at 10,000 lin.ft. per min. by a belt drive from a single 300-hp., 600-r.p.m., wound-rotor, constant-speed induction motor. A speed change could be accomplished by changing the size of the driving pulleys, but this method was not practical for commercial operation as the change must be made quickly and be under complete



Arrangement of controls for the double-motor band mill drive

Either the high- or low-speed motor, both connected to a common pulley, now can drive the saw



control of the sawyer. Inserting resistance into the rotor circuit proved unsatisfactory as the speed then varied with the load.

Louis Olson, president of the company, in cooperation with General Electric Co. engineers, worked out a double motor drive whereby a 300-hp., 450-r.p.m., squirrel-cage induction motor was rigidly connected through the common pulley to the shaft of the wound-rotor motor so that either motor could be used to drive the saw. This insured a constant cutting speed with either the high- or slow-speed motor, at the same time permitting all controls to be handled by the sawyer.

Control is arranged so that the equipment can be started only with the wound-rotor induction motor, whose control panel is interlocked with the automatic oil-immersed primary magnetic switch of the squirrel-cage motor, making it impossible to have power on both motors simultaneously. A speed-limiting relay prevents operation of the squirrel-cage motor starting switch unless the equipment is turning at a speed between 425 and 450 r.p.m.

With an investment of approximately $3,000, a saving of $1,000 a month has been effected by this equipment. By its installation, the elimination of "snaky" cuts in the lumber, faster production, and reduction in planing costs have been made possible.

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A Department for the Industrial Electrical Contractor — the Motor Specialist

MOTOR FORUM

An Exchange of Ideas on Economic Electrical, Mechanical and Business Problems

Junkman, Hock Shop, Chain Store, Broker

How the Non-Electrical Distributors Fare in the Disposal of Motors and Something of Their Influence Upon the Stability of Electrical Distribution

As outlined to the editors
By FRANK E. BOYD
Vice-President and General Manager, Pacific Electric Motor Co., Oakland, Calif.

MAURICE CHEVALIER, the lively French comedian, in his first American movie elevated the name of junkman to "antiquier," a dealer in antiques. Certainly the junkman who has elevated himself to the status of a dealer in electric motors likewise is one who deals in antiques. And yet, surprising as it may seem, the junkman, particularly in large cities, does a business in second-hand motors that many a dealer woud be happy to have.

His is a simple matter of business. You take your motor as you find it. No overhead there, no service, no rebuilding, no guarantee. The junkman wrecks an old plant, or buys scrap-iron and copper that is still mixed up in a running combination, and if somebody wants it he can come and get it. The fact that many motors are sold is attributable chiefly to the fact that a general knowledge of electricity, motors, control and wiring is the possesion of almost every man at all mechanically inclined. If the motor runs he will take a chance with it, buying it from the junkman's lot at what he imagines is a big bargain.

Engineering advice, proper control facilities, guarantees or accident safeguards, codes and ordinances, night emergency service, spare parts, are none of his worries. The customer assumes all risks. It's all junk to the antique dealer.

Nothing can be done about the inroads of this decrepit equipment upon new motor sales. Perhaps the best attitude to take toward it is that perhaps the man who begins the operation of his small project with such junk equipment will grow out of it and need new equipment which can be sold to him by the dealer best able to render the service with the sale. Another thing the electrical industry can do is to convert junk equipment such as this into scrap metal, wherever possible, before it gets to the junkman. Some of this equipment is like a cat. It has nine lives. If it has reached the junk stage it is inefficient, costs too much to operate, and in justice to the customer should be retired from circulation.

Another source of motors and trouble is the bankrupt stock sale, which dumps upon the market at below-cost prices motors sometimes even new—from a dealer who has quit business, or sometimes a large industrial investment in motors from a defunct plant. Perhaps until much of this unemployed equipment is put back to work again this too will be a situation that very little can be done to improve. For the manufacturer it means a lag in the improvement of motor volume until the market has reabsorbed much of this idle machinery again. Motors in "hock" for the "unredeemed pledges" of business solvency are apt to be a problem to us all for a while.

Mail order houses, and chain stores of their making or run along similar lines, live by the cut-price appeal. Not so much here as in the Middle West, perhaps, but enough to be serious for any motor dealer where rural customers are to be served, the mail-order house makes serious competition. Nor are only the fractional-horsepower motors involved. Houses which feature farm machinery find no difficulty in selling even heavy motors.

Engineering service is an instruction sheet or a booklet. A pass is made at advising the proper control equipment and installation, urging local inspection if installed in incorporated towns with ordinances. Spare parts can be had by "return mail." For emergency service the always handy local electrician, victim of this shunted distribution though he is, is recommended. The mail-order house or chain store is not interested in the customer's welfare to the extent of providing this or the other factors necessary to complete motor service—usable second-hand equipment, rental equipment for emergencies, exchange of serviceable equipment or the use of such materials in minor jobs to the benefit of the consumer.

EDITOR'S NOTE—Fourth of a series of studies on the Economics of Motor Distribution, the first three appearing in this year's issues of Jan. 1, April 1, and May 1. On account of convention reports to be published in the July issue, the next article will appear in the August number and will begin the detailed analysis of the motor specialist's business.

Possibly no manufacturer of motors can resist the temptation of a sizeable order from a mail-order company or chain distributing organization, even though he knows that the products he sells to them will be used to cut prices and will injure the business of his other established outlets. The motor may not bear his own trade name, but in these days of compulsory public school education this little subterfuge doesn't kid anybody. In fact the mail-order houses themselves remove all doubt by announcing boldly that "a large national manufacturer" makes their motors for them.

If the national manufacturers who make this sort of distribution possible wonder why motor dealers lose interest in the sale of motors, they should exercise some of the same public school education intelligence for the answer.

Directly, so far, the West has not been afflicted to any large extent by the motor broker. Yet indirectly the Eastern motor broker is the alibi always brought forth for not adjusting discounts on motors to an extent that will make it possible for the motor specialist to earn even expenses on the sale of motors. Therefore, whether we like it or not, the motor broker causes every motor dealer a serious loss in business.

The motor broker is a gambler. He plunges into the large industrial job to offer a very special price on the motors. His price is the dealer's cost or less. Because of the volume of the order he is satisfied with the quantity discount. He has no expense except that of a telephone call. He offers no service, does no engineering, doesn't install or have any of the attendant grief, shifts the performance guarantee to the manufacturer, will not turn a hair on any of the other necessities required to give consumer satisfaction. He has given away the dealer discount, that is all.

Hence, argue the manufacturers, if the discount was increased, the broker would have that much more to give away, the dealer would suffer that much more, and so far into the night.

Even admitting that it would be difficult to prevent the broker from "muscling in" on large orders, and that dealers can do little to assist the manufacturers to control this problem, it appears to be a rather weak-kneed attitude to take to say that nothing can be done by the manufacturer to prevent such operations. One suspects that the desire to correct this evil is not even strong enough to bring about some concrete effort to do so; that perhaps the broker sometimes offers a manufacturer a convenient competitive weapon for price slashing his way into a large order and that perhaps no real effort will be made to prevent this abuse of distribution channels.

It is barely possible that the broker also makes a broad and general excuse for not examining into the real costs of selling a motor and revising margins to make it possible for those who handle them to do so with a reasonable profit. As long as there are methods of seeming to sell their products without cost perhaps the manufacturers are not concerned.

Well, let us next examine into the abilities, qualifications and shortcomings, the costs and the necessities of the dealer, and see whether the manufacturer really can distribute without him; and if so whether the customer will get what he demands.

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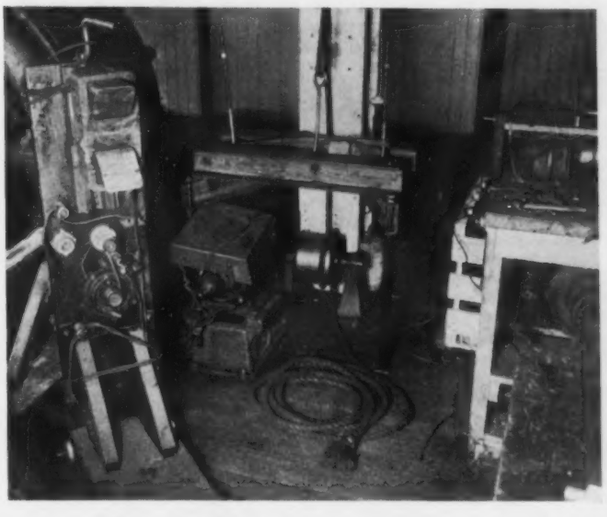
Labor-Saving Devices By Buzzell



SPECIAL labor-saving devices are always a means of speeding up service and performing more satisfactory work. The Buzzell Electric Works, San Francisco motor specialists, have many such. In the above photograph at the left is a portable "growler" mounted on casters to be moved about at will. It is connected to a source of energy by means of a portable cord, but rheostats and test facilities are mounted on the rack as well as are the magnets which form the growler.

At the rear center is a device for stripping old windings. Rotors or stators are bolted to the angle-iron frame. A steel hook supported by a rope which runs over a pulley at the ceiling and down to a snubbing drum is used to pull stubborn windings from old equipment.

At the right is a carborundum saw used for cutting carbon brushes. All of these devices and many more about the shop are the shop-made products of ingenuity.

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Shorting Rotor Bars of Slip Ring Motor Saves Costly Delay

AS OIL shipments follow a schedule far more exacting than the casual purchaser of gasoline may realize, any failure of loading equipment at the large distribution centers may entail demurrage charges running into thousands of dollars. Consequently a report by the operators of the Associated Oil Marine Loading Station at Seaside, Calif., that two 200-hp., 900-r.p.m., 2,200-volt, slip-ring motors driving important pumps refused to run, necessitated immediate investigation.

Upon opening up the motors, it was found that the rotors had burned out. Because of their rating spare rotors were not available within a reasonable time and rewinding would involve a shut-down of at least two weeks. As seven tankers were scheduled for loading within a very few days, M. A. DeLew, electrical engineer for the company, suggested that the emergency be met by shorting out the rotor bars, letting the motors operate as squirrel-cage motors. The rotors were placed in a lathe and a cut approximately 1½ in. wide and 1/16 in. deep was made around the outer ends of the winding. Tinned No. 10 gage wire was wrapped around the rotors at these two points and electrical contact was assured by securely soldering the several turns of the wire to the winding. Although the starting torque was greatly reduced, the fact that this station was handling much

lighter grades of oil than the original design called for made torque requirements of no great consequence.

The first motor was started by allowing oil under pressure to flow through the pump and then, after the motor had attained a speed of 25 or 30 r.p.m. the voltage was applied. The second motor, starting against full line pressure, was started through a compensator. In this manner repairs were effected with but a 10-hr. delay in the loading schedule, the motors still operating satisfactorily under these conditions.

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For Testing Rewinds on Motorless Stators

MANY machines, such as woodworking tools, come equipped with motors built integrally into the machine. Usually these motors are removable but sometimes, when only a stator develops trouble, it is unnecessary to remove the rotors, which are direct-connected to complicated mandrels or knife arbors. When such stators are brought to the motor specialist's repair shop for rewinding it is often difficult, without a rotor, to give the rewound job a proper test before it is replaced on the machine.

Backstrand Brothers, motor specialists of Riverside, Calif., as usual had a solution for the problem. A steel plate, on the center of which is fastened a socket arbor in which can be set a shaft to support roller bearings of various sizes., was made. Over this the rewound stator is placed on the floor, current turned into it, and if operating correctly the outside ring of the ball race will revolve as would a rotor. The device is simple and can be made adjustable to various sizes of motors by fitting larger bearings in place on the shaft.

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Seamless Wedge Driver

WEDGE drivers, used in forcing retaining wedges in slots of motors, may be considered a special tool and usually are hand made and fashioned after original ideas, or a combination of ideas borrowed from others. Most often they may be clumsy affairs machined out of bar steel and riveted together, only to spread and jam under severe service.

A handy, compact driver which has proved its ability to withstand much more abuse than is indicated by its light appearance, is illustrated. The barrel is formed from ⅜-in. O.D. round seamless steel tubing with a 3/64-in. wall. The plunger is a strip of 1/16x7/16-in. rectangular cutlery steel which insures adequate stiffness. At times, rectangular steel tubing of suitable dimensions may be found in metal supply houses, but usually the tool may be made from the round.

Letters to the Editor

Seattle Denies the Allegation

Editor, ELECTRICAL WEST:

In an article entitled "The Coincidence of High Taxes and Government in Business" which appeared in the May number of ELECTRICAL WEST, the author, Mr. R. H. Ballard, quotes the U. S. Department of Commerce Report on Financial Statistics of Cities for the year 1928. He says:

"The volume lists 'Per Capita Governmental Cost Payments for Operation, Maintenance and Interest' for each of 251 cities. The thirteen cities in the top group each has a population of 500,000 and over, an average per capita cost for operation, maintenance and interest of $64.40. Los Angeles is the highest of the group, with a per capita cost of $80.12.

"In the next group, 300,000 to 500,000 population, Seattle heads the list with a per capita cost of $80.56, against a group average of $43.65. In the third group, 100,000 to 300,000 population, Long Beach has the highest per capita cost, $668.95, against a group average of $43.65. Coming to the group of cities of 50,000 to 100,000 population, we find Pasadena second from the top with a per capita cost of $87.89, against a group average of $41.58."

The author does not mention the fact that the per capita governmental cost for operation and maintenance in every case includes the operation and maintenance of public service enterprises, and also interest on utility bonds. The impression he would convey to the reader is that general taxes are highest in the cities that own and operate public utilities.

In the same table of the government report referred to by Mr. Ballard, the per capita cost for operation and maintenance of public service enterprises in Seattle is shown to be $24.74. Interest is stated to be $10.85 per capita, of which $5.97 is for public utility debt and $4.88 for other debt. Thus, the per capita cost of operation and maintenance of public service enterprises, plus interest on public utility debt, is $30.71. The per capita earnings of public utilities in Seattle are reported to be $39.91, so the government report referred to shows that Seattle's public service enterprises make a profit of $9.20 per capita.

In the report in question, Seattle's per capita cost for operation and maintenance of general departments (departments other than public service enterprises) is $44.98, as compared with a per capita average of $47.83 for Group 2, in which Seattle is listed (300,000 to 500,000 population). Light and water rates in Seattle are among the lowest in the country, yet there are earned surpluses of $11,382,548 in the City Light and $9,512,676 in the City Water Department. These surpluses have been applied to redemption of bonds and plant construction. Our utility accounts are classified and audited regularly by accountants of the Division of Municipal Corporations in the State Auditor's office.

It is interesting to note that the net general indebtedness of the City of Seattle at the present time is less than it was twenty years ago.

In each of the other three cities mentioned by Mr. Ballard as highest in per capita cost of their respective groups, the per capita cost quoted by him includes operation and maintenance of municipal utilities, and in each case the government report shows a profit on utility operation.

I am conscious of the fact that your publication enjoys a wide circulation, and I do not believe you want to misinform your readers. I hope, therefore, you will find it possible to use the facts that I have given you in your next edition of ELECTRICAL WEST.

(Signed) I. COMEAUX
Chief City Accountant,
City of Seattle, Wash.

Water Watts High or Low?

Editor, ELECTRICAL WEST:

The article by Harry L. Harper in the March 1, 1932, issue of the ELECTRICAL WEST is very interesting indeed. It should do a lot of good to utility executives, manufacturers of electrical appliances, and contractor-dealers as well.

There is just one point which I would like to comment upon, namely: the connected capacity of 4,000 watts in connection with a water heater..

The tabulation on Page 127 does not indicate the type

of the water heater, but I presume it is a low capacity, high wattage unit. It is stated that this water heater can be counted upon to consume 3,000 kw.-hr. per year. On this basis, the annual energy consumption is at the rate of 0.75 kw.-hr. per watt (3,000/4,000).

I would like to point out that a large capacity, low wattage water heater, equipped with a 1,000-watt heating element, can give the same sort of service as the heater considered in this article, and will consume slightly over 3,000 kw.-hr. per year. This means that the annual energy consumption will be at the rate of 3 kw.-hr. per watt instead of only 0.75.

Looking at it another way, if we assume that the energy to the water heater can be supplied at 1.5c. per kw.-hr., the high wattage heater will produce a return of $11.25 per kilowatt per year, whereas the low wattage heater will produce $45.00 per kilowatt per year. This comparison clearly indicates the advantage of the high capacity, low wattage type of water heater over the low capacity, high wattage type of water heater.

Another point that might be of interest is that the high capacity, low wattage water heater, consisting, let us say, of a 50-gallon tank, equipped with a 1,000-watt heating element, can be operated on an off-peak basis, so that it will be definitely off the system peak, and consequently, its installation will not necessitate any provision in the form of generating and transmission equipment. Energy for such a type of water heater can, therefore, be supplied at a lower rate than the usual type of water heater, which may come on at any time during each 24-hour period.

Consequently, the high capacity, low wattage, off-peak water heater will appeal to the customer because of its low operating cost, and furthermore, is of advantage to the utility because it helps fill the valleys in load curves. The writer feels that utility executives who are not looking into the possibilities of off-peak service in connection with electric water heating are passing up a good bet.

(Signed) A. F. HAMDI, E. E., A. M.
Formerly in charge of Electric Water Heating Division,
Hall Electric Heating Co.,
Philadelphia, Pa.

Fish Refused to Be Shocked

Editor, ELECTRICAL WEST:

Referring to your May 1 number of ELECTRICAL WEST and to an unsigned article entitled "Electric Fish Screen Gives Effective Protection" on page 250:

Since this article would seem to indicate the U.S. Bureau of Fisheries approves of this type of electric screen, the writer feels it necessary to apprise you briefly of the situation, since he has been in charge of an investigation of fish screens and fish ladders for the U.S. Bureau of Fisheries over a period of about four years.

The article states "in a *recent* investigation of this device," etc. This experiment was conducted about four years ago in a hatchery pond in still water, and under conditions differing widely from those existing at irrigation diversions.

The installation shown in the photograph accompanying the article was installed by the U.S. Bureau of Fisheries according to Mr. Burkey's specifications and design and was completed in the spring of 1929. The operation of this screen was not satisfactory, and the grounded type of installation there employed, as well as the use of interrupted current of any kind has been entirely eliminated from use by the U.S. Bureau of Fisheries.

It is not the purpose or the design of the writer to enter into any controversy in this matter, but this is written in an endeavor to inform you of the several misstatements made, and to prevent you possibly from being imposed upon.

(Signed) SHIRLEY BAKER
Consulting Engineer for the U. S. Bureau of Fisheries.

After 40 Years . . .

Editor, ELECTRICAL WEST:

The article in your May issue, entitled "Electric Fish Screen Gives Effective Protection," is very interesting and especially so to me, because some 40 years ago I accidentally discovered that all water life might be electrically controlled in their movements.

At the time I was engaged in designing, for the Thomson Electric Welding Co., at Lynn, Mass., generators and welding transformers far larger than at that time had been built for lighting or power. To test the generators, we designed water rheostats to absorb their output, then an entirely new way to absorb electrical power.

These water rheostats were wooden tanks some 15 ft. long and 4 ft. in cross-section. At one end was placed a cast iron plate and a similar plate could be moved on a track to get any desired resistance in the salt water between them.

The rheostats were not used every day and, in warm weather, quantities of bugs, worms and other forms of living creatures would promptly accumulate in this warm and only slightly brackish water.

We soon noticed that these creatures, which normally swam about in every direction, instantly took a position in which their length was at right angles to the flow of current as soon as the switch connecting the generator to the cast iron plates was closed. On opening the switch, they promptly moved freely in all directions.

As there was then no need to control the movements of fish, for they had things mostly to themselves in the rivers, it never occurred to any of us who noticed the strange actions of the creatures in the polarized water that there was any practical application for this method of control. It is therefore a great pleasure to see this very practical application, after 40 years have elapsed.

(Signed) WALTER S. MOODY
Consulting Engineer,
General Electric Co. Transformer Dept.
Pittsfield, Mass.

A Challenge

Editor, ELECTRICAL WEST:

Your magazine has always been interesting and helpful and I will miss it.

But in our present depression time—product of stupidity, greed and fear—I will have to do without it, since there seems no prospect of going back to work. In the meantime the quotations of beans, oatmeal and hamburger assume absorbing fascination.

This is *some* civilization, where people endure want *because* there is a glut of everything. The problem of production fades into insignificance beside the unsolved task of distribution. And a man past 50, once he is on the sidewalk, may as well make up his mind that he is not wanted and that he must pick up his eats the best he can. Four years ago we were asked to vote for Hoover and Prosperity: "Just give our industrial and financial leaders a free hand and they will see you through!" Nor will a change of party make any difference. Now is the time for clear thinking, for good will and cooperation of all classes.

EDITOR'S NOTE—*This letter was received in answer to inquiry as to reason for cancellation of subscription; obviously the editors feel the name of its sender should be withheld. No more challenging ultimatum ever faced the industry.*

Price Uppance

Editor, ELECTRICAL WEST:

Your editorial query in the May issue—"Who Will Raise the First Price?"—is timely and to the point.

The "strong language," as you call it, was directed to the men in the iron and steel industry who needed something more than soft words to stir them up.

The thing you will be interested in is the fact that the California steel mills, the jobbers and the foreign steel importers have jointly effected a sane, practical working control of the production and distribution of merchant bar and shapes in our California market which actually is producing most gratifying benefits to the industry.

Courage, stamina and sincerity of purpose on the part of a few men who possess vision and who gave unselfishly, or we may say with "intelligent self-interest," a vast amount of their personal time and energy accomplished this. The men will have to continue to sacrifice and to fight in the front line to preserve what they have gained against the scuttle fish which abound.

I know you will be glad to encourage them and to give due recognition to those who accepted the challenge and answered your question in a practical way.

(Signed) E. F. WATKINS
Manager of Purchases and Stores,
Southern California Edison Co. Ltd.

Idaho Kw.-hr. Tax Upheld By U. S. Supreme Court

Constitutionality of the kw.-hr. tax imposed by Idaho on all electric energy generated in that state was upheld May 16 by the United States Supreme Court in an action brought by the Utah Power and Light Co. challenging the validity of the tax.

In an opinion by Justice Sutherland the court drew an important distinction between the generation and transmission of electric current. The court ruled that the interstate commerce feature of the transaction involved in the transmission of power from one state to another did not begin until after generation had been completed.

John F. MacLane, counsel for the company, contended the tax was a burden on interstate commerce and unconstitutional. He advanced numerous objections, among them attacking the provision of the law which relieved his company from taxes on electricity used for irrigation purposes and required it to reduce the bills of those using the power for such purposes to the amount of the tax which the company would otherwise have been required to pay the state.

Sidman I. Barber, assistant attorney general of Idaho, counsel for Emmitt Pfost, commissioner of law enforcement for the state, and Attorney General Babcock defended the tax, insisting it was not an illegal burden on interstate commerce but was a levy on the activity of generation as an intrastate occupation. The right of a state to tax natural gas brought into it and prepared for local consumption had been upheld by the highest court, he said, and was complete authority for the Idaho tax. He insisted the interstate character claimed by the company was destroyed by the transformers it was required to use to make available to the consumer the power it handled.

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Bayley Hipkins Bids Low On Diablo Completion

Bidding $1,744,705, a sum $399,473 less than the second lowest bidder, Bayley Hipkins, Inc., Seattle construction engineering and contracting firm, submitted the low bid last month to the board of public works for completion of the Diablo dam and power house of the Seattle City Light Department. Three bids were offered for this work. The Chatham Construction & Engineering Co. offered to complete the project for $2,144,178, and the Puget Sound Bridge & Dredging Co. for $2,772,036.

None of the three bids was accompanied by either a certified check or a bid bond; each offer specified 6 per cent interest on the bonds which will be proffered in payment for the work and each will be considered by the city council before any definite action is taken toward making an award.

The successful bidder will be required to accept $1,666,000 in a 1927 issue of light and power bonds to cover the cost of the work and $194,000 in 1930 light and power bonds to pay off outstanding warrants against the project.

No bids were received in last month's call by the city council for the purchase of $3,500,000 in light and power bonds, the sale of which was to have covered the cost of the completion of work at Diablo and to pay off outstanding warrants.

Items in the work to be done in completing the Diablo project, on which contractors were asked to bid, were as follows:

1. Diablo power house superstructure, to be erected on existing foundations. Concrete steel building 65x230 ft., complete with lighting, heating, ventilating, plumbing and fire protection systems.
2. Power house tailrace complete (excavation, concrete lining and deck).
3. Assembly and erection of power house machinery previously purchased and now at the site, including two 67,500-kva. hydro-electric generating units, step-up transformers and auxiliary equipment.
4. The furnishing and installation of switchboards, control wiring, switches and switch structures and other equipment to make a completely operative station.
5. The construction of a 220-kv., double-circuit steel tower line, 5.75 miles in length, from Diablo plant to connect with the existing Gorge transmission line. This item includes furnishing and erection of 19 steel towers, with necessary insulators and hardware. Aluminum-steel conductors and accessories are already purchased, but are to be erected under this contract.
6. The construction of a concrete protecting apron for the north spillway of Diablo dam.

Figures submitted by the three bidders on each of the foregoing items are listed herewith:

Bayley Hipkins, Inc.

(1)	$443,566	(4)	$443,426
(2)	$264,815	(5)	$135,933
(3)	$346,081	(6)	$110,844

Total $1,744,705

Chatham Construction & Engineering Co.

(1)	$795,340	(4)	$455,038
(2)	$283,816	(5)	$125,000
(3)	$302,600	(6)	$182,384

Total $2,144,178

Puget Sound Bridge & Dredging Co.

(1)	$620,000	(4)	$880,000
(2)	$342,916	(5)	$212,000
(3)	$540,000	(6)	$177,120

Total $2,772,036

Early in the year Mr. Hipkins made an unsolicited offer to finish construction work at Diablo for $1,647,000, payment to be made in City Light bonds in lieu of cash. His offer also included the purcase for cash of $1,563,000 in bonds, the proceeds to be used by the city to pay off warrants and other obligations for labor, materials and equipment incurred under existing Diablo contracts, and for cashing warrants issued for the construction of the City Light Tower. (See ELECTRICAL WEST, March 1, 1932, p. 148.)

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THE SHARKEY ACT, which provided for conservation of oil in California through the creation of an oil conservation commission was defeated at the May 3 election in that state.

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When Winter Comes to the High Sierra

PITMAN CREEK diversion dam on the Southern California Edison Co.'s system as it appeared on Feb. 11, 1932. In the foreground is the walk around the top of the dam covered by 9 ft. of snow; beneath the square mound is the recorder house.

Pitman Creek is below Huntington Lake; Pitman Creek diversion dam diverts the water of Pitman Creek into a conduit that runs from Dam No. 2 at Huntington Lake to the channel of the North Fork of Stevenson Creek and thence into Shaver Lake.

Domestic Rates Cut In Colorado

Southern Colorado Power Co., with headquarters in Pueblo, has announced, through W. N. Clark, its president, rate cuts to domestic customers varying from ½ to 1 c. per kilowatt-hour. The reductions became effective May 21. In addition to Pueblo and Canon City, the company serves many smaller communities in agricultural and mining areas.

About half the annual estimated $75,000 savings to customers will fall to Pueblo under the new schedule, which provides a reduction from 9 c. to 8 c. per kilowatt-hour. The average rate in other Southern Colorado Power Co. territory is now 10.8 c., and will be a flat 10 c. after May 21. Cripple Creek and Victor, mining towns where 11.7-c. rates have prevailed, will be put on an 11-c. basis. Westcliffe, also in the mine region, will have its rate lowered from 13.5 to 13 c. per kilowatt-hour.

This is the second rate cut made by Colorado electric utilities recently. Public Service Co. of Colorado lowered rates to Denver customers March 15.

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B. C. Electric's Ruskin Project at Night

NIGHT view of the Ruskin development of the British Columbia Power Corporation. Location of the switching structure above the power house has necessitated the brilliant lighting of the roof of that building.

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Commission Rules in San Joaquin Rate Case

Domestic and commercial lighting users get the largest proportion of a $650,000 reduction in light and power rates of the San Joaquin Light & Power Corp. and its subsidiary, Midland Counties Public Service Corp., ordered by the California Railroad Commission May 25. The commission's order culminates the series of complaints against rates of the San Joaquin corporation extending over more than a year, hearings on which were concluded by the commission in March. (See ELECTRICAL WEST, April 1, 1932.)

Reductions to the various classes from 1930 rates are estimated by the commission's staff to be as follows:

Class of Consumers	San Joaquin Light&Power Corp.	Midland Counties Public Service Corp.	Total
Domestic lighting	$174,900	$17,400	$192,300
Commercial lighting	118,000	14,500	132,500
Public outdoor lighting	30,000	3,500	33,500
Domestic combination heating and cooking	30,300	----------	30,300
Commercial heating and cooking	4,800	----------	4,800
General power	70,700	22,600	93,300
Agricultural power	142,000	17,000	159,000
Street railway power	4,300	----------	4,300
Total	$575,000	$75,000	$650,000
Total urban	$374,200	49,600	423,800
Total rural	200,800	25,400	226,200

Reductions will not run uniformly to all consumers. As to some the bills will not be lowered, but as to others the reduction will be greater than the average.

Agricultural power gets a 12½ per cent discount on charges for energy in excess of 1,000 kw.-hr. per horsepower of connected load. This, it is said, will extend the reduction to those consumers who are not merely short-time users and whose equity is stronger than that of those who use power "merely for a short time during the peak of the irrigation season."

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Idaho Power Company's Domestic Rates Lowered

A reduction of ½ c. per kw.-hr. in the top step of the domestic lighting rate of the Idaho Power Co. will be placed in effect June 18. The reduction was announced May 20 by the state public utilities commission and had been arrived at through cooperation of the commission with the power company.

The basic rate affected by the new schedule is the 8 c. per kw.-hr. charge, which was reduced to 7½ c. The reduction, it is estimated, will affect about 20,000 customers and will mean a saving of 20 c. a month in the power bills of most residential users.

Several smaller companies in Idaho have simultaneously been ordered by the public utlities commission to reduce their rates as a result of the commission's effort to bring about a reduction in power rates generally throughout the state.

Public Ownership Loses In Mayoralty Recall Vote

Climaxing a determined effort by municipal ownership advocates to obtain control of the administrative branch of the city government, the recall of Mayor John D. Porter was made an election issue in Los Angeles May 3. With a vote greater than that of his nine opponents, the mayor was retained in office by the people of that city. Charles W. Dempster, Mayor Porter's nearest opponent, who had announced he was running as the "poor man's candidate," had the backing of the Municipal Light and Power Defense League.

Conflicting policies in the management of the Los Angeles Department of Water and Power came to a head three days after the election, when the mayor removed from office Commissioners Dr. John R. Haynes and A. F. Southwick. The occasion for the removal order was the action of Commissioners Haynes, Southwick and John W. Baumgartner in returning the Department of Water and Power to dual management, or two-bureau system, against the wishes of the mayor. By vote of these three of the five commissioners, the two-bureau system of department management became effective May 9, with H. A. Van Norman as general manager of the Bureau of Water Works and Supply and E. F. Scattergood as general manager of the Bureau of Power and Light. Mr. Baumgartner later retracted his vote and was therefore not included in the mayor's demand for resignation.

Upon recommendation of its water and power committee, composed of Thomas F. Ford, James M. Hyde and

Charles H. Randall, the city council has refused to assent to the removal from office of Dr. Haynes and Mr. Southwick, and the mayor has countered with a threat to invoke the right provided by the city charter that a commissioner may be recalled by the same procedure employed against the mayor himself.

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Early Construction of Parker Dam Advised

Approval of major features of the Colorado River aqueduct plan and a suggested change with reference to the time of beginning work on the Parker diversion dam are contained in a report of the board of consulting engineers submitted April 29 to the board of directors of the Metropolitan Water District of Southern California. The directors adopted a resolution reiterating their former declaration as making final the selection of the Parker route for the proposed aqueduct and the construction of it to handle 1,500 sec. ft. of water in its ultimate development.

The report of the consulting board was comparatively brief, touching as it did only upon the major features directly. Plans and designs of the thirteen-mile San Jacinto tunnel were approved, as were the forms of contracts and specifications, which will be the standard forms used in all work on the line.

Work on the Parker dam should begin at an early date in the construction program, the report said. This is a reversal of the suggestion of the first engineering board of review, which proposed that construction be delayed until the water from Hoover Dam be permitted to scour out the silt in the river bed.

The board recommended that the district provide power for construction work along the line, purchased from reliable operating power companies under satisfactory contracts. If such contracts cannot be obtained, it is recommended that the district put in its own power plants.

The portion of the board's report recommending the acquisition of additional reserve storage reservoirs cleared the way for the opening of negotiations between the district and the City of Pasadena for the use of the proposed Pine Canyon reservoir now under construction by Pasadena. Concerning the Pine Canyon reservoir, the report said that the board believes that storage volume in this reservoir will be of especial value and that it should be made available for use. If offered on a proper basis, the board would favor purchase of storage in the reservoir.

Members of the board which made the report are Thaddeus Merriman, New York, chairman; Arthur P. Davis, Oakland; Richard R. Lyman, Salt Lake City; Harvey S. Mudd, Los Angeles; and Royal W. Sorensen, Pasadena.

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Everett Street Lighting Goes to Puget Sound Co.

The city of Everett, Wash., has rejected, for the present at least, the offer of the City of Seattle to extend its service within a year's time to furnish power for street lighting, and has decided to re-sign a contract with the Puget Sound Power & Light Co., on a five-year contract, to supply street lighting at about 2.257c. per kilowatt-hour.

Ultimate decision of the battle for electric business between the Seattle City Light Department and private power operators may now await the outcome of plans, rather nebulous at present, to place before the Snohomish County voters this fall a proposal to form a public power distributing enterprise to cover the whole county and to buy power wherever the best price and service can be obtained. J. D. Ross, superintendent of Seattle City Light, in sparring for the Everett lighting contract, stated that Seattle would be able to supply the city within a year or so at greatly reduced rates, and urged against signing a five-year contract with the power company. He proposed to build a transmission line into Everett from Firland Sanitarium.

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No Bids Received on Salem (Ore.) Diesel Plant

No bids were received by the State Board of Control of Oregon for the furnishing of a 740-kw. diesel power plant to serve the state capital building, state office buildings, supreme court, hospital, penitentiary and other state institutions in and around Salem. May 12 was the date set by the board for the opening of bids on two 280-kw. and one 180-kw. diesel generating units at 2,400 volts, with distribution lines and transformers and control equipment to serve some twelve of the state institutions.

Doubt as to the method of payment for the plant was presumed to be the reason for the lack of bids. Some prospective bidders sent letters stating the conditions under which they would bid. No new proposal has been made by the Board of Control.

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SOUTHERN CALIFORNIA EDISON CO.'S board of directors, at its meeting April 29, the first since the death of John B. Miller, chairman, decided to discontinue the office of chairman of the board. The business of the company will go forward under the direction of the president, Russell H. Ballard, with advice and counsel of an enlarged executive committee of the board, consisting of George I. Cochran, Henry M. Robinson, Albert W. Harris, Ben R. Meyer, James R. Page, Harry J. Bauer, George C. Ward, senior vice-president, and Mr. Ballard. Other operating officers of the company were continued, including William C. Mullendore, executive vice-president; Fred B. Lewis, vice-president and general manager, and Roy V. Reppy, vice-president and general counsel.

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Boulder City Looks Like Real Town Now

(Left) Boulder City residence of H. O. Watts, superintendent of the substation built by The Southern Sierras Power Co. to supply power for Hoover Dam operations. Note the contrast between this permanent structure of Spanish type architecture, with tile roof, and the row of temporary frame buildings (right) put up by the Six Companies, Inc., builders of the dam, for use by their employees. Several permanent buildings, similar in type to the house occupied by Mr. Watts, have been erected in Boulder City by the U. S. Government

Puget Sound Co. Accepts Two Rock Island Units

Puget Sound Power & Light Co. has formally accepted the equipment installed in two completed, 20,000-hp. units of the Rock Island hydro-electric project on the Columbia River, W. H. McGrath, vice-president announces. Two of the four units are in operation and performing better than specified requirements, he said. The acceptance covers generators by the General Electric Co., transformers and switches by Westinghouse Electric & Mfg. Co., and waterwheels by Allis-Chalmers Mfg. Co. The other two units, each of 20,000 hp., are being installed, together with electrical equipment, and will be completed and tested by the end of this year, the time scheduled. About 100 men are now engaged on the project.

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Air Conditioning Society Formed in San Francisco

Organization of an Air Conditioning Society of San Francisco was effected at a luncheon meeting held May 13 at the States Restaurant in that city, when officers were elected as follows: president, H. L. Lincoln, Union Ice Co.; vice-president, Fred W. Kolb, American Air Filter Co.; secretary-treaurer, J. W. Wrenn, Pacific Gas and Electric Co. The motive which prompted the formation of the society was the desire to continue the work done during the past year by the air conditioning committee of the Pacific Coast Electrical Assn. To the group of men comprising that committee have been added others interested in various phases of air conditioning— contractors, manufacturers of equipment, etc.

Mr. Wrenn presided at the meeting and outlined the purposes of the organization. It was agreed that future meetings, to be held once a month, would each be devoted to discussion of air heating as applied to a specific field; for example one meeting will be confined to the subject of air conditioning in theaters, another to office buildings, another industrial plants, and another homes.

An announcement of the meetings to be held will shortly be sent to architects and engineers in the San Francisco Bay district with post card enclosures on which they may indicate the type of air conditioning applications in which they are most interested. They will then receive invitations to attend appropriate meetings.

The following are charter members of the society: E. C. Cooley, American Blower Corp.; F. W. Devers, York Ice Machine Corp.; Frank Mosher, manufacturers' agent; Harry M. Thomas, manufacturers' agent; J. F. Park, Carrier Engineering Corp.; N. A. Naylor, Minneapolis Honeywell Co.; J. Gums, J. W. Wrenn, R. I. Meyerholz, C. M. Mardel and W. H. Park, Pacific Gas and Electric Co.; E. D. Price, Ilg Electric Ventilating Co.; H. T. Holbrook, Union Ice Co.; R. A. Brobeck, D. F. Shearer Corp.; F. W. Appelgren, Western Blower Co.; George H. Freear, Armstrong Cork & Insulation Co.; H. L. Lincoln, Union Ice Co.; B. Macfie, M. S. Ozone Co.; Fred W. Kolb, American Air Filter Co.; G. M. Pamphilon, W. C. Phillips Co.; C. M. Welshons, National Ice & Cold Storage Co.; Charles C. Hardy, B. F. Sturdevant Co.; Elmer S. Riley and T. J. Supplee, Frigidaire Corp.; L. A. Stone, Western Engineering Corp.; J. C. Shea, Carrier Engineering Corp.; Charles T. Phillips, Phillips & Cooper; R. E. Pierce, I. H. Bennett Co.; G. W. Nunn, Crane Co.; K. I. Dazey and Victor W. Hartley, Pacific Coast Electrical Bureau.

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115-Kv. Submarine Cable Brings Power To Portland From Ariel Project

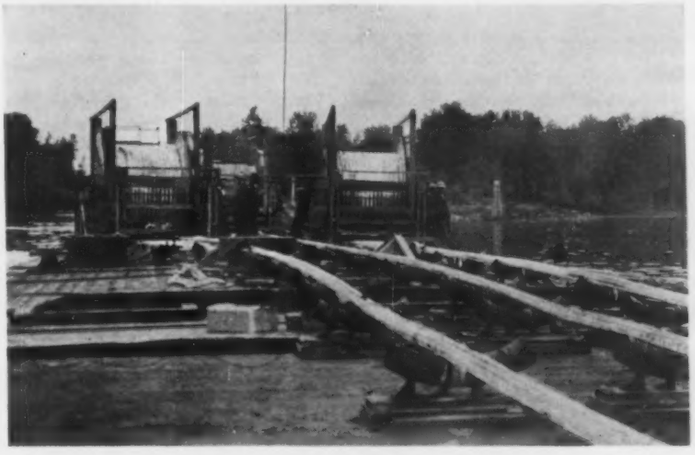
THE highest voltage (115 kv.) submarine transmission cable yet to be laid is now being installed by the Northwestern Electric Co., Portland, across the Columbia River between Vancouver, Wash., and Portland, as a major link in the transmission line from the Ariel power plant on the Lewis River to Albina substation, Portland. Actual laying of the cable across the river was completed May 12, and the tying in with the already built overhead sections of the line is scheduled for completion early in June, after which Ariel power can be routed direct to the load center instead of by the more round-about route via the overhead crossing near Camas, Wash. The line will be operated temporarily at 66 kv.

The cable installation is in two separate sections: one crossing the Columbia River from the Washington shore to Hayden Island, 3,700 ft. in length; the other from the island across Oregon Slough to the Oregon shore, 1,515 ft. in length. The line crosses the ½-mi. width of the island on H-frame towers.

The cable is single conductor, 750,000 circ.mil. copper, with 0.69-in. hollow core, oil-filled, with wood pulp insulation, lead sheathed, cushioned with jute, armoured with No. 4 hard drawn copper strands, and with a tarred and soapstoned jute cushion over all. The circuit will have a continuous rating of 114,000 kva. at 115 kv. Cable, potheads, oil reservoirs and emergency oil reservoirs were furnished by General Electric Co.

The cables terminate at reinforced concrete structures built on the edge of normal high water on which terminal potheads and auxiliary devices are mounted above flood stage. The transmission line is dead-ended on 35-ft. steel towers erected on these structures. A high and low oil level alarm, actuated by mercury relays at the reservoirs, is transmitted by a signal circuit approximately two miles to the Vancouver substation.

Cables are laid 4 ft. apart directly on the river bottom without trenching. Three reels, each containing a full length of conductor, were mounted on a barge which drew itself along by anchor lines successively placed by tugs. Phoenix Utility Co. made the installation.



Reels containing 115-kv. cable placed on a barge from which the cable is being laid on the bed of the Oregon Slough

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Completion of Seal Beach Steam Addition Postponed

Completion of an additional 50,000-hp. generating unit at the Seal Beach steam station of the Los Angeles Gas and Electric Corp., construction of which was begun in February this year, will be deferred until re-establishment of satisfactory load conditions warrants additional generating capacity, according to H. L. Masser, vice-president and executive engineer of the corporation. Present work on the unit will end with completion of the foundation structure.

Announcement of plans for the new unit, to increase the capacity of the Seal Beach station to 148,000 hp., was made in October last year. Estimated cost of the project was $3,500,000, to include the cost of an addition to the station, the new unit, new transmission line and new substation facilities.

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THE VERA (WASH.) ELECTRIC CO., a municipal enterprise has voted to erect a 60-kv. substation and to buy its power from Washington Water Power Co.

George F. Oxley Resigns From N. E. L. A.

After twelve years of service at New York headquarters of the National Electric Light Assn., George F. Oxley resigned May 1 as director of information and service.

Mr. Oxley entered the employ of the association in 1920 as director of publicity under M. H. Aylesworth, then managing director of the N.E.L.A. He had previously been associated with Mr. Aylesworth in Denver as secretary of the Colorado State Public Utilities Commission.

All advertising and publicity activities of the N.E.L.A., and all information services, including publication of the *N.E.L.A. Bulletin*, have been directly under Mr. Oxley's supervision. His resignation was accepted with regret by Bernard F. Weadock, newly appointed managing director.

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Westinghouse President Urges Balanced Budgets

Business revival rests upon the ability of individuals, corporations, municipalities, states and federal departments to balance their budgets, in the opinion of F. A. Merrick, president of the Westinghouse Electric & Mfg. Co., who visited the Pacific Coast offices of that organization last month. Mr. Merrick stated that there recently has been a marked swing toward a more optimistic attitude on business conditions but that noticeable progress toward recovery would not be evident until some time after the beginning of the rise.

He stated that executive thought throughout the country has abandoned efforts to maintain the artificial strain of 1929 conditions and is endeavoring to build business on the sound economic basis of balanced budgets. In commenting upon the administration's efforts to hasten recovery, Mr. Merrick endorsed the activities of the Reconstruction Finance Corporation, the efforts of which have succeeded in reducing bank failures and stimulating a better feeling throughout the country. Public construction should be devoted to productive work and not merely used as a means of giving temporary employment.

As regards the electrical industry, Mr. Merrick sees signs pointing to an optimistic future. Appliance sales have maintained an encouraging volume and within recent weeks industrial inquiries have increased materially, pointing toward prospective business for industrial equipment. Increased activity in the appliance and industrial lines will result in a resumption of buying in the heavy equipment line, he said.

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P.G. and E. Files Answer In Rate Complaint Case

An answer denying that present electric rates are unjust, unreasonable or discriminatory has been filed by Pacific Gas and Electric Co. in the rate cases instituted by the cities of San Francisco, Oakland, Berkeley, Piedmont, and the California Central Traction Co., Northwestern Pacific Railroad, Peninsular Railway Co., Petaluma and Santa Rosa Railroad Co., San Jose Railroads and Stockton Electric Railway Co. The answer asks that the Railroad Commission order the various complaints dismissed.

A similar answer is made to the investigation ordered by the Railroad Commission on its own motion into the reasonableness of the company's rates. Hearings before the commission are to be held in June.

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Puyallup, Wash., Gives Up Municipal Power Plans

After a controversy which has waged for three years, the city council of Puyallup, Wash., has decided not to enter the electric light and power distribution business, but will allow the Puget Sound Power & Light Co. to continue in the field, the company agreeing to pay to the city $25,000 to defray costs which the city has encountered during several years in anticipation of taking over the company lines and business.

The voters had voted to condemn the light company's distributing system within the city and put the entire system under municipal ownership.

The ordinance authorizes the settlement and dismissal of the action in the United States district court taken up on appeal after the City of Puyallup had successfully carried through its condemnation action in the Tacoma federal court.

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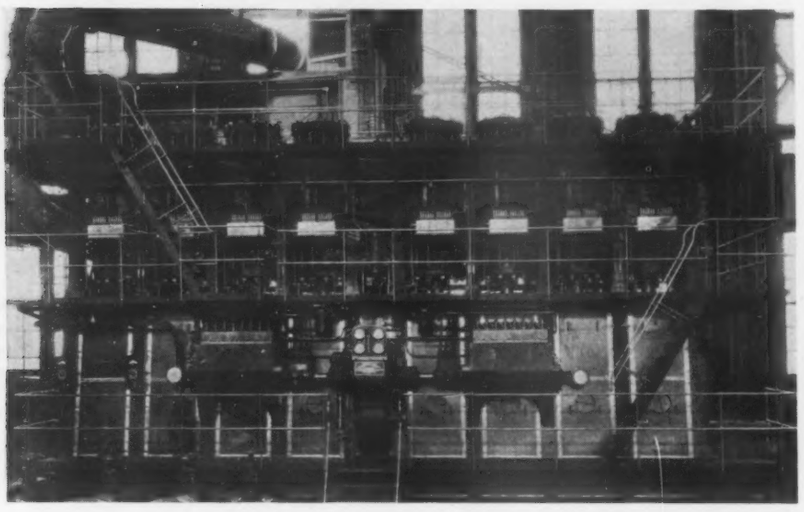
Diesel Engine for Vernon's Municipal Plant



ONE of the five 7,000-b.hp. double-acting, two-cycle, solid-injection diesel engines of the M.A.N. type being constructed by the Hooven, Owens, Rentschler Co., Hamilton, Ohio, for the municipal generating station of the City of Vernon, Calif. Each engine has eight cylinders of 24-in. bore and 36-in. stroke, and will be direct-connected to a 5,000-kw., 6,900-volt, 50-cycle, 3-phase generator. Scavenging air will be supplied to the engines from separate, independently operated blowers. The engine-generator unit will measure 56 ft. in length and weigh nearly 850,000 lb. When completed in January, 1933, the plant will be the largest diesel station in the world.

News Shorts

¶ BANTA-CARBONA IRRIGATION DISTRICT (San Joaquin County, Calif.) and Pacific Gas and Electric Co. have entered into a seven-year agreement, approved by the Railroad Commission, under which the company supplies all the electric power needed by the district, it being the intent and purpose of the contract that all pumping plants in the district shall be electrically-operated. The new agreement supersedes that of July, 1929.

¶ A SECOND $50,000 APPROPRIATION has been given Los Angeles' community chest from municipal water and power funds and an additional $100,000 requested may be appropriated within three months. Thus needy Angelenos will be cared for during the summer.

¶ WASHINGTON'S DEPARTMENT OF PUBLIC WORKS has ordered the Willapa Electric Co. to reduce power and light rates in Raymond and adjacent rural territory, saving customers some $8,500 annually.

¶ TULARE, CALIF., must wait until June 21 for the Railroad Commission hearing on its application to fix the compensation to be paid the Southern California Edison Co. Ltd. for distribution lines within Tulare city limits.

¶ SAN FRANCISCO'S $6,500,000 Hetch Hetchy bond issue passed 14 to 1 at the May 3 election, assuring continuance of work on the water system. Funds provided will finance the driving of 5 miles of tunnels through the Coast Range, concrete lining of 11½ miles of tunnel already driven, construction of Alameda Creek siphon and the laying of 1 mile of pipe line, it is hoped.

¶ REFERENDUM PETITIONS are being circulated in Bellingham, Wash., designed to include a rider on the (as yet) unsigned five-year street lighting contract between the city and Puget Sound Power & Light, which would permit the city council to cancel the contract should other power units be formed in the district.

¶ REDLANDS WATER & POWER CO., subsidiary of Cities Service, has completed its $100,000 plant near Grand Junction, Colo., and is operating at full capacity, 2,050 hp. Excess power, over that needed for irrigation purposes in Redlands irrigation district, will be purchased by Public Service Co. of Colorado for distribution in Grand Junction.

P. C. E. A.

Main Events of Program Scheduled

An outline of the program of the convention of the Pacific Coast Electrical Assn. to be held June 15-17 at Pasadena, Calif., is announced by D. L. Scott, convention chairman, to be as follows:

Wednesday, June 15

8:00 a.m. Registration

10:00 a.m. General Session.
The usual convention business, annual reports, and an inspirational opening address.

Noon Luncheon Program. Address by Dr. Vierling Kersey, State Superintendent of Public Instruction.

2:00 p.m. The Forum of the Industries. Addresses by outstanding figures in several vital industries—agriculture, railroads, petroleum, and automobile.

5:00 p.m. Meeting of executive committee.

8:30 p.m. President's reception, to be followed by dancing.

Thursday, June 16

10:00 a.m. General Session, devoted to the remarkable lecture demonstration by Dr. Ellis L. Manning, "Adventures in Science." This address will be illustrated by the extensive laboratory display from the laboratories of the General Electric Co. at Schenectady.

Noon Women's luncheon in honor of Mrs. Day.

2:00 p.m. Parallel sessions of sections and women's committee.

6:30 p.m. Women's committee dinner.

8:30 p.m. General Session—W. C. Mullendore, presiding; Paul M. Downing, speaker.

Friday, June 17

10:00 a.m. General Session—"Views of the Industry." Addresses by power company executives and others, dealing with important problems of the electrical industry.

Noon Luncheon, in charge of entertainment committee.

2:00 p.m. General Session—"The March of the Sections." Presentations of their work by several of the sections of the association.

7:00 p.m. Annual banquet..

Saturday, June 18

Morning Annual golf tournament.

Entertainment for the ladies is being planned by the entertainment committee, under the leadership of Richard E. Smith.

Hotel Huntington at Pasadena has offered special rates to those attending the convention of $8 single and $7 double per person per day, including meals. Hotel reservations should be made through R. A. Hopkins, chairman of the hotel committee, 420 South San Pedro St., Los Angeles.

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Western Prize Winners in Speaking Contest

MRS. Edith Hammond, of the San Joaquin Light & Power Corp., Fresno, won first place in the women's division, and Brennand Singleton, of The Southern Sierras Power Co., Riverside, won among the men in the Western regional semi-finals of the N.E.L.A. employees' speaking contest held at Salt Lake City, May 27. Both had won previously in the P.C.E.A. quarter-finals at Fresno, Calif., earlier in the month, and were awarded $100 each in prize money. Contestants at the Fresno hearing, left to right, were Frank Cooper, winner of second place and $75; Miss Audrey White, third place, $50; Mrs. Hammond; Mrs. Alfreda Poole, second place, $75; Garrett Van Buren, third place, $50; and Mr. Singleton.

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Prizes Awarded in Essay Contest

With 70 per cent participation of employees eligible to compete in the P.C.E.A. essay contest, Coast Counties Gas and Electric Co. has earned the President's Trophy, a perpetual cup given by A. B. Day, president of the association, and awarded this year for the first time. The cup will be presented at the association's convention this month.

The contest was conducted jointly this year with the Pacific Coast Gas Assn., with employees of companies in both associations writing on the subject of "Government Ownership."

Extent of participation of employees of the electrical departments of the companies was as follows:

Company	No. of Essays (less gas dept.)	Per Cent of Participation of Eligible Employees
Coast Counties Gas & Electric Co.	96	70.1
Los Angeles Gas and Electric Corp.	1,271	69.1
San Diego Consolidated Gas & Electric Co.	442	6[illegible].8
The Southern Sierras Power Co.	346	58.0
Central Arizona Light & Power Co.	57	2[illegible].0
San Joaquin Light & Power Corp.	272	[illegible]
Southern California Edison Co. Ltd.	461	11.8
Tucson Gas, Elect. Light & Power Co.	7	[illegible]
Pacific Gas and Electric Co.	185	[illegible]

Prizes have been awarded to the writers of winning essays as follows:

First ($100)—Howard A. Sullivan, advertising department, San Joaquin Light & Power Corp.

Second ($75)—Frieda Redman, Lancaster office, Southern California Edison Co.

Third ($50)—Ethel A. Hall, [illegible] department, Southern California Edison Co.

Fourth ($25)—Paul L. Emerson, auditing department, The Southern Sierras Power Co.

Next Ten Prizes—$15 Each

Southern California Edison Co. Ltd.: Prentis C. Hale and Elsie Levy, accounting

ing department; James A. Meyers, Montebello office.

The Southern Sierras Power Co.: Marjory N. Bates, executive department; Leta E. Gilliland, treasury department; Violet Looney, Calexico office.

Los Angeles Gas and Electric Corp: Guy Corfield, chemist; George M. Sadler, accounting department; Lyndon Thueson, bookkeeping department.

Central Arizona Light & Power Co.: Charles Dunn, Jr., engineering department.

Next 25 Prizes, $10 Each

Los Angeles Gas and Electric Corp: Ashley Caswell Woody, electrical distribution department; Max E. Turner, gas distribution department; Warren W. King, bookkeeping department; Nathan S. Kuhn and Paul C. Kuntz, new business department; James F. Lewis, collection department.

Southern California Edison Co. Ltd.: Leonard L. Lambuth, meter department; Marcella B. Ashley, commercial department; Edna Patterson, right-of-way department; Durant L. Danielson, Santa Barbara office; G. N. McKinnon, distribution department (Long Beach).

Pacific Gas and Electric Co.: D. J. Fee, engineering department; Mrs. Beulah Brown, personnel department; M. A. L. Willson, publicity department; Agnes Burrell, publicity and advertising department.

San Diego Consolidated Gas and Electric Co.: A. V. Bryant, electric production, Station B; James H. Bach, record department; Mrs. Dorothy L. Hughes, stenographic department.

Southern Sierras Power Co.: Paul H. Yelton, Randsburg; Helen Rogers, rate department, Riverside.

Coast Counties Gas and Electric Co.: O. E. Fisher, accounting department; E. M. Brickley, sales department.

San Joaquin Light and Power Corp: Frank C. Krasny, operating department; Lee R. Duncan, engineering department.

Tucson Gas, Electric Light & Power Co.: Mrs. Blanche H. Walker, accounting department.

Fifty prizes of $5 each also were awarded, the winners being selected by drawing.

The essays submitted by the winners of the first and second prizes are published in full elsewhere in this issue of ELECTRICAL WEST.

Judges in the contest were S. W. Murray, Westinghouse Electric Supply Co.; Harry C. Goldrick, Graybar Electric Co.; Victor Hartley, P.C.E.A.; and F. B. Nightingale, General Electric Supply Corp.

Northwest Association

Accounting Section Committees Report

Following is a resume of indivdual committee reports and papers presented at the meeting of the Accounting Section of the Northwest Electric Light & Power Assn. at Spokane, April 18-19. A general account of proceedings at the meeting appeared in the May 1 issue of ELECTRICAL WEST.

Customers Records

GUS ANDERSON
Utah Power & Light Co., Chairman

Five papers on various phases of handling customers' records, by different members of the committee, were read and discussed. "The Practicability of Having a Standard Electric Bill Form," by A. R. Weiderman, Puget Sound Power & Light Co., raised discussion leading to a decision to give this subject further study by the committee next year.

The advantages of centralized billing, bringing out the economy and efficiency of this method as against the decentralized method, were portrayed in a paper by J. F. Terry, The Washington Water Power Co. Some of the essential features of this plan as it is operated for two large districts of the company were outlined. Discussion brought out further advantages of the centralized plan realized through the check on customers' accounts afforded by it.

The growing problem of how to detect and deal with persons stealing energy by jumpers around meters and other methods was the subject of a paper by F. L. Nagel, Northwestern Electric Co. He classified offenders into those making illegal connections unintentionally, those engaged in illicit business and desiring to hide their use of energy for fear of being caught at their other offense, and the out-and-out thief. It was brought out that each group required different technique in methods of detection and in treatment after detection. Successful methods of detection were outlined.

Advantages and disadvantages of quarterly or bi-monthly billing as against monthly billing were discussed by R. W. Lawlor, Pacific Power & Light Co. The advantages of economy in meter reading and billing gained by less frequent billings were shown to be offset in large part by disadvantages in collections, sales campaigns and contact with customers. Discussion brought out that the higher the monthly bill the more desirable would be frequent billing. No company in the territory now bills less frequently than monthly, and some companies serving vacation areas and other classes of transitory business bill such customers oftener than monthly.

Allen Ashton, Idaho Power Co., presented methods used to secure meter readings when the first call fails to produce results. The use of dial postcards, attempt to have customer change wiring so meter location can be changed (in habitual cases), and cooperation with wiring contractors were recommended. Some companies render no bills for "skips"; others render minimum or estimated bills. A purposely high estimated bill to habitually offending customers was indicated as a successful method of bringing such customers to the office for conference.

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General Records

M. J. WILKINSON
Pacific Power & Light Co., Chairman

This committee, on assignment from the national general records committee which is preparing a report on internal auditing, outlined the necessary requirements for an adequate internal audit of accounts receivable—customers' accounts receivable, contract sales accounts receivable, interest and dividends and capital stock outstanding. Each of the above was taken up in turn, and the factors involved in a check of the accuracy of records pertaining to them were explained. Discussion brought out that the auditing or checking of some of these factors could be accomplished through the accounting plan or method used so that they would not have to be periodically checked by an auditor.

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Purchasing and Storeroom

I. E. JOSLYN
Idaho Power Co., Chairman

Pointing to the difficulties involved in supervising the supplying, housing, issuing and accounting for stocks carried in small branch-office unattended storerooms, this committee report analyzed the need for such stocks, the importance of control, the use of storage facilities and the maintenance of the stocks, and advocated the application of decentralized stock-keeping with centralized accounting for such stores. Summarizing its very complete analysis, the report offered the following requisites for the successful and economical conduct of small storerooms: conveniently located quarters with storage facilities for separation of issue stock from tools and equipment; restriction of merchandise stock to a small reserve beyond display needs; instillation of the idea among all employees of the necessity of recording transactions at the time supplies are brought in or removed; location of control records in central office; constant attention to disposition of excess or sub-standard materials; personal supervision by chief storekeeper through periodic visits; and minimum number and simplicity of forms.

Fixed Capital

GEORGE F. MACKENZIE
Pacific Power & Light Co., Chairman

Discussing the principles underlying the two schools of thought relative to ownership of jointly-used poles, Mr. Mackenzie outlined the procedure followed in the plan of joint ownership employed by the several parties to the eighteen-year-old agreement in Portland. He pointed out that, in spite of the apparent complexity of the Portland situation due to the multiplicity of accounting entries it imposes, the establishment of adequate routine machinery and the exercise of ordinary care results in "no greater amount of difficulty than in accounting for any other class of fixed caiptal. Discussion developed champions of the "individual ownership school," while the advocates of joint ownership contended that, because ideal conditions never exist in practice, their plan produced the most equitable property records for all utilities concerned and a more favorable final result for all in "net divisible earnings."

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Classification of Accounts

A. J. JOHNSTONE
Portland General Electric Co., Chairman

The committee had prepared answers to questions pertaining to interpretation of the classification of accounts on various subjects raised by member companies. It was pointed out that the answers represented a consensus of committee opinion, and some of the more controversial questions of interpretation elicited considerable discussion with some difference of opinion. The character of the report was held to be so valuable for meetings of this kind that it was suggested the same form of report be continued next year with a new set of questions and answers.

A. I. E. E.

Vancouver Convention Plans Under Way

Under the direction of G. R. Wright, chairman, the Pacific Coast convention committee has completed preliminary arrangements for the annual meeting of the American Institute of Electrical Engineers to be held in Vancouver, B. C., Aug. 29 to Sept. 2. Convention headquarters will be at the Hotel Vancouver, one of the finest in Canada and one offering every facility necessary for a successful convention.

The technical program includes papers on power generation, communication and transportation, among which will be descriptions of the British Columbia electric power system, the Rock Island development of the Puget Sound Power & Light Co. on the Columbia River, corona loss investigations to 600 kv., and an interesting discussion on the segregation of hydro-electric power costs.

British Columbia offers unsurpassed opportunities for all forms of recreation and the committee is taking advantage of these in arranging an unusual program of entertainment. Convention dates being at the height of a vacation schedule, it has been suggested that combining the convention with a vacation will make it possible to enjoy the scenic beauty of British Columbia and the Northwest and at the same time participate in this constructive program of the electrical industry.

Meetings

Portland Electric Club Elects Officers

At the recent annual election of the Portland Electric Club, Berkeley Snow, Northwest editor ELECTRICAL WEST, was elected president for the year 1932-33. Other officers elected were: vice-president, James B. Buman, Northwestern Electric Co.; secretary-treasurer, A. B. Carlon, Stubbs Electric Co.;

BERKELEY SNOW
President, Portland Electric Club

sergeant-at-arms, W. J. Cottrell, Allied Industries. Elected members of the executive committee are E. M. Fouch, Fouch Electric Mfg. Co.; E. L. Knight, E. L. Knight Electric Co.; L. W. Going, chief electrical inspector; and T. W. Fitch, Portland General Electric Co. Last year's president, Harry W. Brown, The Electric Corp., automatically assumes position on the committee.

The club has about 100 members and proposes to enlarge this membership. The new executive committee is laying plans for an interesting series of events for the coming year.

At the club's annual golf tournament in April, M. I. Mullen, Marwood Co., of Oregon, walked off with the championship, gaining title for a year to the Electric Club cup.

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Welding Congress Holds Annual Northwest Meeting

The fourth annual Pacific Northwest Welding Congress was held in Portland April 28-30, under the sponsorship of the Portland Section of the American Welding Society. The theme of the Congress was built around the myriad of uses of welding in industry, with 21 firms exhibiting illustrations of various applications. Demonstrations of electric arc and gas welding were carried on continuously and were open to the public at an admission of 25c. Seven hundred delegates from the Pacific Northwest and California registered.

Outstanding educational features at the business sessions were discussions of practical welding methods by H. B. Isings, Woodberry & Co., Portland, and of hard surface methods by Ralph S. Beeler, J. E. Hazeltine & Co., Portland.

The Northwest Congress, now managed by A. Whisnant, had its inception three years ago at the School of Engineering, Oregon State College, Corvallis, when Dean H. S. Rogers of that institution inaugurated the first welding conference. George C. Dierking, The Steel Tank & Pipe Co., Portland, is president of the Portland Section, A.W.S., and R. V. Romig, of the Beall Pipe & Tank Co., was chairman of the program committee for the Congress.

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All Industry Branches Represented At Annual Denver League Meeting

CONTRACTORS, inspectors, manufacturers' agents, central station representatives and dealers from all over Colorado assembled in Denver April 27, when the Electrical League of Colorado held its seventh all-industry meeting, to pool their collective experience and ideas bearing on the electrical industry's past, present and prospects.

Outstanding among the addresses was one by Sam Sherman, manager of the May Co.'s electrical division in Denver. Since the May Co. entered the electric appliance field in a big way two years ago it has been an enthusiastic participant in Colorado trade relations activities. This cooperation, Mr. Sherman said, had paid big dividends, enabling the department store to profit through knowledge of successful merchandising policies employed by other dealers, especially the electric utilities.

J. J. Hannemann, National Lamp Works representative, called attention to the enormous field for active promotion of adequate illumination in homes and industry generally, with its inevitable benefits to manufacturers, contractors and central stations.

Forty-two years of experience backed the contention of W. A. J. Guscott, veteran Denver electrical contractor, who maintained that linemen wiring homes and business establishments should also be salesmen operating principally for the benefit of customers and incidentally to procure more high-class business for his firm. He denounced the "cheap wiring job" as a fire hazard, pointing out that false economy on such installations was expensive to community, customer and contractor.

Speeches by L. A. Vosmer, proprietor of the Queen City Electric Co., and L. A. Barley, chairman Rocky Mountain Division Chapter, I.A.E.I., elaborated on the theme of careless or cheap wiring. Both men quoted statistics to prove adequate wiring the best insurance against fire losses.

An inspirational, illustrated talk by G. B. Buck, general commercial manager, Public Service Company of Colorado, indicated the route to large expansion of all branches of the electrical industry in the West by intelligently directed sales efforts. He dwelt on the stability of the local situation.

George E. Lewis, Rocky Mountain Division manager of the N.E.L.A., spoke on "Another Million in 1932." His message dealt with the unprecedented activities that had placed hundreds of millions of dollars in circulation as a result of manufacture, advertising, sale and installation of electric refrigerators. He characterized ice cubes as, "the vertebrae—the backbone—of a large part of the electrical and allied industries during the past two eventful years."

"Trend of the Times" was handled by successive speakers representing manufacturers, contractors, power utilities, wholesalers, the telephone company and electrical inspectors. The remarkable results derived from cooperative trade relations work in the Rocky Mountain region were praised; and the vital importance of continuing the movement was hammered home by each speaker.

A. C. Cornell, Graybar Electric Co., presided at the morning session. L. M. Cargo, president of the Electrical League of Colorado, responded to the address of welcome delivered by C. H. Elliott, Public Service Company of Colorado. John J. Cooper, the Electrical League's new manager, reviewed the organization's recent program and objectives. League planning and coordinating influence, he said, had contributed largely toward "keeping the industry on an even keel in Colorado."

Matthew Whitney, Colorado Springs contractor, invited the league to his city for its 1933 conference.

Coming Events

American Institute of Electrical Engineers—Annual Pacific Coast convention, Vancouver, B. C., Aug. 29-Sept. 2, 1932.

Illuminating Engineering Society—Twenty-sixth annual convention at New Ocean House, Swampscott, Mass., week of Sept. 26, 1932.

International Association of Electrical Inspectors, Northwest Section—Seventh annual convention at Wenatchee, Wash., Sept. 6-8, 1932 (tentative).

Southwest Section — Convention at Santa Barbara, Calif., Sept. 12-14, 1932.

National Electric Light Association—Annual convention and exhibit, Atlantic City, N. J., June 6-10, 1932.

Rocky Mountain Division.—Annual convention at Stanley Hotel, Estes Park, Colo., Sept. 12-14, 1932.

Pacific Coast Electrical Assn.—Annual convention at Huntington Hotel, Pasadena, Calif., June, 15-17, 1932.

Personals

H. H. Henline Made Acting Secretary of A.I.E.E.

BY unanimous action of the board of directors of the American Institute of Electrical Engineers at its regular meeting held May 20, Henry Harrison Henline, since 1927 assistant national secretary, was appointed acting national secretary of the Institute. In his new capacity Mr. Henline takes over the executive duties performed for twenty years by the late F. L. Hutchinson.

For many years Mr. Henline has been interested in and actively associated with the Institute's work, and prior to his affiliation with the national headquarters staff, made numerous contributions to its published technical works. He was elected to membership in 1919, and has served as chairman of the San Francisco Section (1922-23); faculty conselor for the A.I.E.E. student branch at Stanford University (1926); chairman of the committee on student activities for the Pacific District (1926); and as a member of the national sections committee (1923-27). Since joining the staff on Jan. 1, 1927, Mr. Henline has served as the Institute's representative on the American Year Book advisory board (1927-32); American Standards Assn. (alternate representative 1929-32); Joint Committee on State Engineering Councils (1932-33); and has served on the A.I.E.E. education committee (1929-32). He now becomes a representative of the Institute on the assembly of the American Engineering Council.

Mr. Henline graduated at the University of Illinois in 1914, later entering the Chicago Central Station Institute of the Commonwealth Edison Co., graduating in 1916. He then joined the commercial engineering department of the Illinois Maintenance Co., of Chicago.

Joining the faculty of Stanford University in 1917 as an instructor, Mr. Henline later was promoted to assistant professor (1920) and to associate professor (1924) in the department of electrical engineering. In his work of instruction he gave at various times many courses in electrical engineering subjects, and was in charge of the machinery laboratory for five years and of communication engineering for three years. He also was associated with Dr. Harris J. Ryan in some of the high-voltage research that has made Stanford famous. He is the author of papers on engineering education and a standard-frequency radio station, and joint author of three papers on subjects relating to high-voltage electric power transmission.

In addition to those already mentioned, Mr. Henline's organization memberships include the Society for the Promotion of Engineering Education, Institute of Radio Engineers (member), American Assn. for the Advancement of Science (fellow), Eta Kappa Nu and Sigma Xi.

H. H. HENLINE

J. E. E. ROYER

J. PRIESTMAN

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J. E. E. Royer Again Advanced by W.W.P. Co.

ACCORDING to a recent announcement of Frank T. Post, president of The Washington Water Power Co., Spokane, J. E. E. Royer, general manager, was elected a vice-president of the company at a recent meeting of the trustees. Mr. Royer will continue also as general manager.

Mr. Royer entered the employ of The Washington Water Power Co. in October, 1907, following his graduation from college. His first work was with construction crews in connection with the maintenance of power stations and substations. He was next assigned to the light and power department, and in 1919 was made assistant superintendent of that department. In November, 1924, he was appointed assistant general manager and became general manager in 1930.

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HOWARD I. MILHOLLAND, who has been program manager of the Pacific Division of the National Broadcasting Co., with headquarters in San Francisco, has been appointed manager of KGA, Spokane, effective May 15, according to announcement of Don Gilman, vice-president of the National Broadcasting Co. Thomas H. Hutchinson, who has been associated with the production department of the National Broadcasting Co. for a long time, has been appointed to succeed Mr. Milholland as program manager.

M. L. STANNARD, division commercial manager, Southern California Telephone Co., Los Angeles, and a second vice-president of the Los Angeles Electric Club, has been transferred to the San Francisco office of the Pacific Telephone and Telegraph Co.

M. L. CUMMINGS, JR., advertising manager, Utah Power & Light Co., Salt Lake City, has been elected president of the Salt Lake Advertising Club.

J. Priestman Joins B.C. Service League

"JACK" PRIESTMAN, head of the outside sales staff of the B. C. Electric Railway Co., has been appointed assistant secretary of the Electrical Service League of British Columbia.

Mr. Priestman joined the service of the B. C. Electric as a boy and rose through all the stages in the merchandising department to his recent position as head of the outside sales staff. He has now severed his connection with the company and assumed his new post at the Vancouver office of the Service League. Announcement of the appointment was made by R. Hall, secretary of the League.

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CLYDE L. SEAVEY, president of the California State Railroad Commission, speaking before the Commonwealth Club of San Francisco on May 19, told his hearers that state regulation of public utilities in California had eliminated rebating and other forms of unjust discrimination, maintained rates within reasonable bounds, effected sound utility financing and established and enforced high standards of public service. The success of public utility regulation was debated at the same meeting by William L. Peet, of Palo Alto, who asserted that "regulation has failed to properly protect the public."

H. I. WAMBEAM, electrical engineer, El Paso Electric Co., addressed members of the New Mexico A & M College Engineers' Club, March 31, upon the importance of selectivity on the part of student engineers during their college days. The speaker urged his hearers to make up their minds regarding the branch of engineering they intend to follow and then to apply their college training to the practical problems of that particular branch.

W. K. TURNER, formerly of Los Angeles, has been named Seattle representative of Curtis Lighting, Inc., succeeding E. C. Bossler, and has established offices in the Terminal Sales Building.

A. B. WOLLABER

R. R. WALBRIDGE

San Diego Co. Engineer Goes to Minneapolis

ANNOUNCEMENT has been received from the Chicago headquarters of the Byllesby Engineering & Management Corp. of the promotional transfer of Harold H. Watson, formerly construction engineer for the San Diego Consolidated Gas & Electric Co., to the same position with the Northern States Power Co. at Minneapolis, Minn.

Mr. Watson has had considerable experience with a number of utility companies since 1911, having served in various engineering capacities with the Arkansas Valley Railway, Light & Power Co.; the Tennessee Power Co.; the Fort Smith Light & Traction Co., and in the Sioux Falls and Mankato (Minn.) branches of the Northern States Power Company.

He came to San Diego in 1921 where he was identified in the construction of the new salt water tunnels, power plant additions at Station "B," and most recently a four-story service building.

Born at Wetmore, Colo., in 1890, Mr. Watson was educated in the University of Colorado; was an engineer instructor in the U.S. Army during the World War and holds a membership in the American Society of Mechanical Engineers, and Associate Membership in the Society of Civil Engineers.

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ALFRED MAY, formerly superintendent in charge of investigations and complaints for the San Diego (Calif.) Consolidated Gas & Electric Co., has been promoted to the office of assistant commercial manager, working directly under A. E. Holloway, vice-president in charge of sales and commercial manager. Mr. May has been an employee of the San Diego company for 22 years and has assisted in pioneering the company's business in all nearby municipalities served by that utility.

DAN CHAMBERLIN, of the Globe Electric Co., Seattle, will represent the Electric Club of Seattle on the vocational committee of the Seattle School Board, a committee recently formed to assist school children in determining their fitness for various professions and trades.

W. B. DONALDSON, since April 1, 1929, purchasing agent for the Puget Sound Power & Light Co., Seattle, has resigned to accept a position with The White Co. Mr. Donaldson had been associated with the Puget Sound Power & Light Co., for about 20 years, having entered its employ in January, 1912, after having served three years as purchasing agent for the Seattle-Tacoma Power Co. During 1921 he served as president of the Washington Purchasing Agents' Assn., of which he is a charter member.

RALPH CRISWELL, former member of the Los Angeles city council and for many years Colorado River agent of the city's Board of Water and Power Commissioners, has been re-employed by the board again to fill the latter position. The position had been abolished about a year ago as unnecessary. Mr. Criswell's work will center largely in Washington, D. C., in connection with land and rights-of-way matters.

E. A. LOWDEN has been appointed manager of the refrigeration division of the Canadian Westinghouse Co. for all Canada. Mr. Lowden has for the past five years been Canadian manager of the Frigidaire Corp., being connected with this company since its inception in the Dominion.

VINCENT D. KENNEDY, former secretary to ex-Governor Young, of California, and for the past year examiner with the State Railroad Commission, has been named southern California representative of the commission. Mr. Kennedy took over his new duties on April 1.

JAMES LIGHTBODY, publicity manager for the British Columbia Electric Railway Co., Ltd., has been made general convention chairman of the Pacific Advertising Clubs Assn., which will hold its convention in Vancouver July 5-9.

RALPH B. MATHEWS has been appointed to the legal staff of the British Columbia Electric Railway Co., Ltd., at Victoria, B. C. He will assume the post of assistant to Atwell D. King, formerly held by the late B. G. Goward.

A. B. Wollaber to Retire From Edison Co. July 1

A. B. WOLLABER, district manager for the past thirteen years for the Southern California Edison Company Ltd. at Pasadena, Calif., and for twenty years a member of the Edison organization, will retire on pension July 1, this year. He will be succeeded by R. R. Walbridge, manager of the company's western division and also a veteran in the Edison organization.

Mr. Wollaber joined the Edison company July 1, 1912, as assistant district agent in Los Angeles. He previously had spent 22 years in the federal government service. This service included the signal corps, United States Army, and the Department of Agriculture. Edison company offices which Mr. Wollaber filled with distinction included those of assitant district agent at Long Beach, following his initial service in Los Angeles; district agent at Santa Monica and at San Bernardino, and district agent and district manager at Pasadena. He was appointed to the Pasadena district managership July 1, 1919.

Mr. Wollaber has the distinction of having directed the early work and training of a number of men who now hold important general office and district positions with the company. The present district managers at Santa Barbara, Santa Monica and Oxnard are among the district officers who first served the company under his managership.

Mr. Walbrige has been manager of the company's Porterville and Santa Barbara districts, and in 1929 became manager of the western division. He entered the company service Aug. 1, 1911, as a bookkeeper in the Long Beach district. He became district manager at Porterville, in the San Joaquin Valley, in 1920 following service as cashier, traveling auditor and chief clerk in the Santa Ana, Los Angeles and Porterville districts. In 1926 Mr. Walbridge was appointed manager of the Santa Barbara district, continuing in that office until 1929 when he was appointed western division manager.

Obituary

CARL J. RHODIN, consulting engineer with offices in San Francisco, was found dead at his home in Oakland, Calif., on May 3, a suicide. For more than a year he had been doing valuation work for the Pacific Gas and Electric Co. He was a member of the San Francisco Section, American Society of Civil Engineers, of the San Francisco Engineers' Club and the Commonwealth Club, of whose city planning section he was chairman.

GEORGE MOORE, owner of Moore's Radio Electric Co., 1162 Lincoln St., San Jose, died April 30, 1932.

Contractor Dealer Inspector

More Wage Reductions Made in Building Trades

Wage reductions continue to be made in the building industry, all of which materially affect the wage scale of electric workers and consequently the electrical contractors of the West. Both in San Francisco and Los Angeles such wage reductions have been made.

In San Francisco the movement was inaugurated by the Builders Exchange which announced a 20 per cent reduction in wage scale for all building trades in the city effective April 18. In the case of the electrical workers, this scale was not accepted by the San Francisco Electragists, who are in support of the wage established by the Impartial Wage Board set up by the Industrial Assn. of the East Bay and San Francisco. This wage board set the scale for 1932, as in the past, for $9 per day. Upon inauguration of this movement, the San Francisco Electragists conferred with the Industrial Assn. as to releasing their obligation to maintain this scale; the electrical workers' representatives concurred and a new scale was set at $8 a day. Under the Builders Exchange scale the electrical workers would receive $7.20 a day and fixture hangers $6.40 a day. The Industrial Assn. supports the $8 scale for San Francisco.

The Electrical Contractors and Dealers Assn. of Los Angeles, after a ballot among its members and the trade in that territory, established the official wages as follows:

Foremen	$8 per day
Wiremen	$7 per day
Helpers	$5 per day
Apprentices	$4 per day

The San Mateo County (Calif.) Building Trades Union likewise agreed to accept a voluntary wage reduction varying from 8 to 20 per cent, effective April 18.

The wages of the Pueblo (Colo.) building trades craftsmen have been reduced approximately 10 per cent. The State Industrial Commission decided that the suggested 20 per cent reduction was far too much and decided upon the 10 per cent.

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R. M. SHELTON and his son H. A. Shelton have started an electrical contracting concern in Ellensburg, Wash., know as the Ellensburg Electric Shop. The senior Shelton had been a substation operator for the Chicago, Milwaukee & St. Paul Railway at Taunton, Minn., while H. A. comes from Los Angeles where he had been working for a contractor doing studio work largely. He is also a specialist in sound equipment.

J. P. SLATER, Oakland, Calif., has been awarded subcontract for electrical work in a new $1,000,000 postoffice building at Sacramento under the general contractor, N. P. Severin Co., Chicago.

They Remember When

Eddy W. Supplick, of Eddy Electric Co., Stockton, and Tom Bennett, former electrical contractor and estimator who is now with Triangle Conduit Co., recalls the days when both worked with the tools. The reunion took place at Sacramento on the Electragists' boat ride

Home Appliance Shop in the Home District

DENVER'S newest electric appliance store, opened March 1, is that operated by Harvey M. Olmstead and Dexter H. Edwards at 1518 Stout St. The Electric Home Appliance Shop—so named because it specializes in household equipment to the exclusion of all else—handles General Electric products.

The junior partner, Mr. Edwards, graduated less than a year ago from University of Colorado as an electrical engineer, but his experience in the electrical business dates back to 1922 when he became factory representative at Denver for Apex vacuum cleaners and Rotorex washing machines. After several years' success in this line, he disposed of his interests to complete his college education.

Better known to the industry is Harvey Olmstead who established the first G. E. retail store in Denver where he handled construction material as well as household appliances. He has won several cash prizes for sales accomplishments, and, in 1931 was awarded a trip to General Electric Co.'s famous "House of Magic" and other Eastern points, in recognition of his feat in selling the largest number of radios in G. E. Intermountain territory. He is credited with a "first sale" in Denver of complete G. E. home laundry equipment.

The Home Appliance Shop does not depend on downtown customers, but wages an aggressive campaign in residential districts, with trained crews of electrical appliance salesmen.

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National Convention Dates and Place Set

Dates for the annual convention of the Association of Electragists-International have been announced by Laurence W. Davis, general manager. The convention this year will be held at Hotel President, Kansas City, Mo., Oct. 10-12.

This convention will be held at the same place at which the electrical contracting industry met a year ago to decide on the trade practice rules which were submitted to the Federal Trade Commission. Since that time the rules have been officially sanctioned by the Federal Trade Commission but to date no procedure has been set up for making them effective. One of the important topics at this convention, no doubt, will be the procedure for effective application of these rules.

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THE RAINIER ELECTRIC CO., Seattle, headed by Julius M. Hooper, will move to 809 Olive Way, from its present location at 1109 Third Ave., where the firm has been located for five years.

Mountain Inspectors Hear Need for Standardization

The necessity for economical electric range installation costs, the relationship of adequate wiring to fire hazards, and the standardization of equipment to curb heavy wastes, were subjects emphasized at the second annual meeting of the Rocky Mountain Chapter, International Assn. of Electrical Inspectors, held in Denver April 28 and 29.

A. R. Woolley, manager of range sales, General Electric Supply Corp., dwelt on the need for a portable electric range attachment which will enable owners to move from one residence to another without expensive rewiring. He also pointed out the necessity to reduce initial wiring costs which stand in the way of popularizing electric cooking. He cited Pueblo, Colo., with a saturation of 25 per cent, despite an unfavorable rate, as contrasted with Denver, with considerably less than 10 per cent, to exemplify the effects of economical installation.

M. M. Koch, superintendent of electrical transmission, Public Service Co. of Colorado, had some interesting observations on "Four-Wire A.C. Secondary Network Systems," which are being increasingly used in Denver because of economy, efficiency and safety. Colorado Springs has standardized on four-way networks, he said, with very satisfactory results.

Nationally famed for his safety ideas, T. P. Treadwell, fire chief and electrical inspector at Fort Collins, Colo., addressed the group on "Salesmanship" as it applies to selling homes and business establishments on adequate wiring to safeguard against fire hazards. His approach to business firms, he said, was on a cold, commercial basis—reduction of insurance premiums by placing their property in a preferred classification.

Victor H. Tousley, electrical field engineer, National Fire Prevention Assn., urged standardization of equipment to curb heavy waste in all branches of the electrical industry and as an agency to stabilize production and employment. He particularly urged "utmost respect and consideration for the National Electrical Code, without which the industry would be in chaos."

The report of V. C. Moulton, secretary-treasurer of the Rocky Mountain chapter, I.A.E.I., revealed that misuse of electricity was responsible for the second largest number of fire losses during 1930 in Colorado. He listed the most common electrical fire hazards and the remedy: "Educate the public in the proper use of electricity."

A highlight of the convention was an assertion by R. S. Cabell, who spoke on "Gas Tube Signs," that within the next five years inert gas will largely be used instead of incandescent lamps as an illuminant for home, business establishment and street lighting purposes. He stated that a starter no larger than a match folder, operating on 60 volts, is being developed to activate inert gas. Mr. Cabell is an official of the Electrical Products Corp., of Chicago.

Election of the following officers concluded the two-day session: chairman, A. E. Burt, city electrical inspector, Colorado Springs; first vice-chairman, F. H. Beatty, fire chief and electrical inspector, Clayton, N. M.; second vice-chairman, T. P. Treadwell. V. C. Moulton was re-elected secretary-treasurer. On the executive committee are: L. H. Barley, Denver, the retiring chairman; G. L. Dobson, Pueblo; W. H. Harold, Ft. Morgan,; M. M. Koch, L. C. Klinger, Sterling; John Malpiede, Denver; William Trudgeon, Denver; E. E. Brazier, Denver; Clifford B. Noxon, Denver; and D. M. Faris, Greeley.

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Fee Scale of Portland Examining Board Amended

Amendments to the Portland electrical ordinance pertaining to fees of the examining board and to penalties for failure to take out permits have recently been passed by the city council. The examining board of three members which gives examinations to applicants for supervising electricians in the various electrical contracting shops used to receive a flat fee of $20 per examination regardless of the number of applicants. Under the amended provision of the ordinance each member of the board will receive $3 for the first applicant and $2 for each additional applicant at any one examination. The expense of the examination will be self-supporting in that each applicant pays a fee of $10. The amendment provides also for similar fees to the examining board for master plumbers, which heretofore served without pay.

With respect to penalties for failure to take out a permit for electrical work within 48 hours after inspection, the ordinance is amended to charge a flat extra inspection fee of $2.50 over and above the original permit fee regardless of the size of the job. Formerly the penalty consisted of doubling the permit fee, which, in the case of small jobs, was not considered severe enough to induce strict compliance with the regulation requiring permits for all new electrical work.

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ALTA ELECTRIC & MECHANICAL CO., San Francisco, will do the electrical work on a group of reinforced concrete college buildings for the Sisters of the Sacred Heart, 1100 Franklin St., in that city.

CONTRACTORS OF MARIN COUNTY, Calif., recently organized the Marin County Contractors' Assn. with Harry Eklund, Electragist of San Rafael, as president, and Gene Bogle, of the Bogle Electric Co., San Rafael, as secretary-treasurer. Meetings are held monthly.

BOWER & BUTTON, 712 S. Pacific Ave., San Pedro, Calif., dealers in Westinghouse appliances and radios, recently have been appointed dealers also for Westinghouse refrigerators in that district.

H. C. REID CO., 389 Clementina St., San Francisco, was awarded the contract for a lighting system on Sloat Blvd., between Nineteenth Ave. and Great Highway, of that city.

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New Owners of an Old-Time Firm

THE M. J. WALSH ELECTRIC CO. is probably the oldest electrical contracting and lighting fixture concern in the Pacific Northwest. It does a large contracting business and has its own factory for building and finishing lighting fixtures. This company was established by the late M. J. Walsh in 1892. For many years it was located at 311 Stark St. and then at 106 Fourth St. Mr. Walsh died about six years ago, but operations were carried on by the same personnel. In September, 1931, a reorganization was accomplished and a new ownership declared. The new owners and managers are Joseph G. Galarneau, former secretary and assistant manager, and Arthur R. Johnson, former superintendent of the wiring department. Mr. Galarneau had been with the company twelve years and Mr. Johnson eight years. As in the past, the former will have charge of the lighting fixture end of the business and the latter of the electrical contracting end.

A. R. JOHNSON

J. G. GALARNEAU

Manufacturer Distributor

Westinghouse Employees in May Appliance Compaign

A new drive on Depression's tenacious forces was launched by Westinghouse during the month of May when 35,000 employees of the company were banded together as a nation-wide sales crew for the sale of Westinghouse home appliances. According to M. H. Callard, campaign manager, Westinghouse Electric & Mfg. Co., with offices in San Francisco, Westinghouse employees themselves were responsible for this unique idea. Even the executives of the company entered into the spirit of the campaign and sold appliances personally during May. As ELECTRICAL WEST went to press, Mr. Callard reported that results of the sale were meeting expectations, and that it was estimated by the company that $2,000,000 worth of appliances would be sold throughout the country.

Briefly, the plan operated as follows:

During May every Westinghouse employee was expected to sell at least one Westinghouse household appliance through an established dealer—a total of 35,000 appliances A sales manager was appointed for each works, district and subsidiary to direct local activities, teams with team captains and lieutenants being formed by the sales manager.

Each employee was required to interview relatives, friends, landlords, banks and stores where these employees spend their earnings, in an attempt to create prospects for electrical appliances. The cooperation of selected Westinghouse dealers was then sought in actually closing sales. When prospects originating from employees' activities are eventually sold, the employee will be given credits in proportion to the number and kind of appliances sold, credits applying in a contest with rewards to employees.

The appliances involved were the complete Westinghouse home electrical line of refrigerators, ranges, washing machines, vacuum cleaners, fans and heating appliances. Advertising material to be used when interviewing prospects and to be mailed to distant friends, also complete instructions to enable employees inexperienced in selling to do a good selling job, were supplied by the company. A carefully aranged plan of encouraging, helping and following up prospects to insure results formed a part of the plan.

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LEO J. MEYBERG Co., San Francisco, has been appointed by the Chamblin-Thomas Co., of that city, as distributor in California and Nevada of the Edicraft line of electrical appliances manufactured by Thomas A. Edison, Inc., West Orange, N. J.

Refrigeration Bureau Formed in Los Angeles

At a meeting held in Los Angeles on May 5 the Electric Refrigeration Bureau of Los Angeles was organized and George Belsey, president, George Belsey Co., Ltd., distributor of General Electric refrigerators, was elected permanent chairman. The meeting was attended by 50 representatives of manufacturers, wholesalers and retailers. Fourteen different makes of electric refrigerators were represented.

R. G. Kenyon, Southern California Edison Co. Ltd., presided, and the chief speakers were H. H. ("Kelly") Courtright, president, Valley Electrical Supply Co., Fresno; and K. I. Dazey, managing director, Pacific Coast Electrical Assn.

DEMAND FOR ELECTRIC IRONS SPEEDS PRODUCTION—Increased demand for electric irons during the past two months has caused the Edison General Electric Appliance Co. to turn on full production of this item at its Ontario (Calif.) plant. The plant as a whole is now operating at about 70 per cent of its capacity as compared with 50 per cent during the past eight months, according to E. H. Richardson, manager.

BOGATIN AND ARENSBERG, 1613 Third Ave., Seattle, Wash., have dissolved partnership through the purchase of Mr. Bogatin's interest by J. H. Arensberg, who has become sole owner of the business. He will continue to wholesale and retail radios, radio tubes and Mohawk refrigerators.

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San Francisco Frigidaire Headquarters

OCCUPANCY by the Frigidaire Sales Corp. of this headquarters building at 1400 Van Ness Ave., San Francisco, has made possible the centralized display in one location of all Frigidaire products. The northern California factory branch of the Frigidaire Sales Corp.; Scott-Buttner Co., Frigidaire's San Francisco apartmen house dealer; and the commercial dealer, Shirar-Young Co., all have headquarters on the upper floors of the building. Its central location also brings the manufacturer's service organization within the shortest possible distance from the majority of Frigidaire users. C. C. Lee, district manager for Frigidaire, explains that customers who wish to purchase Frigidaire equipment of any kind need no longer shop around but may now find all models at this one location.

Below is shown the ground-floor salesroom, where every type of commercial and domestic refrigeration equipment, including the corporation's new air conditioning units and water coolers, may be inspected. Open house was held for ten days following the grand opening on April 23.

G.E. and Westinghouse Marketing 10-c. Lamp

To combat the influx into the American market of low-priced Japanese incandescent lamps, General Electric and Westinghouse on May 1 began marketing a metal filament lamp to sell for 10 c., the price at which the Japanese lamps have been selling. Known as Type D (not Mazda) lamps, the new 10 c. lamps carry the name "G.E." or "Westinghouse," but not in the companies' regular trade-marked style of lettering used on Mazda lamps. They are at present produced in 15-, 30- and 60-watt ratings, inside frosted and in colors. The 30-and 60-watt lamps have a life of 500 hours, the 15-watt a 750-hour life. (Mazdas have 1,000-hour life.)

Although they are intended primarily for chain-store sale, where foreign lamp competition is keenest, there is considerable speculation in the trade as to whether or not these lower priced lamps will interfere seriously with the sale of Mazdas at twice the price.

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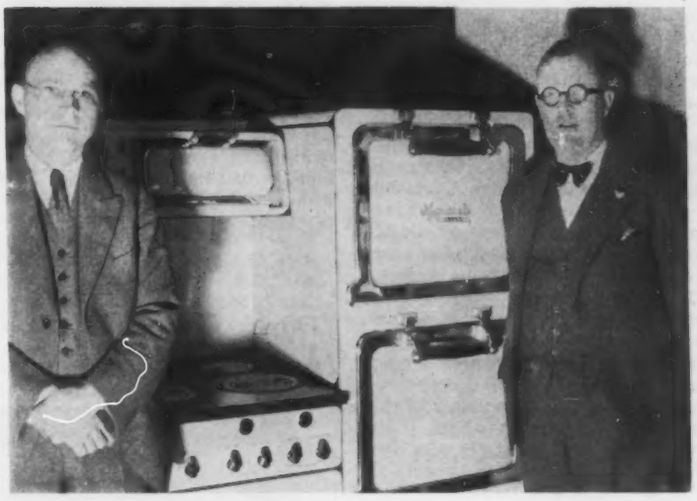
THE WASHING MACHINE SERVICE CO., 918 West Seventh Place, Los Angeles, has opened a branch in Oakland, Calif., at 2110 Telegraph Ave., according to announcement of William Vogel, president and general manager. B. R. Ayres, who has had wide experience in the washing machine business, previously having been associated with Capwell's, Oakland, the 1900 Corporation and the Maytag Co. of California, has been made manager of the new branch. The establishment of this branch will make available to the company's northern California dealers wringer rolls, replacement parts, and service for all washers.

W. L. May, 58 Security Bldg., Portland, has been appointed representative of the Washing Machine Service Co. for the state of Oregon.

B. M. WILLIAMS, formerly factory representative on the Pacific Coast for the Black & Decker Mfg. Co., manufacturer of the Cinderella washer, has joined the Electric Supply Co., Oakland, jobbers of Black & Decker products. Prior to joining Black & Decker, Mr. Williams was for two and a half years sales representative for the Maytag washer on the Pacific Coast, and before that was with the Easy Housekeeping Shop in southern California as a sales organizer.

HARPER-MEGEE, INC., Seattle, have taken on the A B C line of washing machines manufactured by Altorfer Bros. Co., Peoria, Ill., formerly handled in the Seattle territory by the Majestic Distributing Co. Harper-Megee, Inc., are also Servel refrigerator distributors throughout their territory, which includes Oregon, Washington and western Montana.

New Sponsors of the Monarch Range



PARTNERS in a new business, Clyde L. Chamblin (left) and H. M. Thomas line up beside a Monarch electric range, for which they have taken over distribution in California. The large and attractive display room of the Chamblin-Thomas Co. at 630 Mission St., San Francisco, houses the most complete showing of Monarch ranges on the Pacific Coast. This headquarters serves not only for the viewing of models by sales representatives of utility companies, but is open to dealers to bring their customers for the selection of models not kept in stock by themselves. No retail sales are made by the Chamblin-Thomas Co. from this display, although dealers are privileged to make their own sales at this official Monarch headquarters.

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GRIGSBY GRUNOW CO., Chicago, manufacturer of Majestic electric refrigerators and radios, has announced the appointment of Jacques Trynol as its educational and promotional manager in the Western territory. The company is represented on the Pacific Coast by Thompson Holmes, Ltd., San Francisco, Ungar & Watson Corp., Los Angeles, and the Majestic Distributing Co., Seattle.

LINCOLN ELECTRIC CO., Cleveland, Ohio, has appointed the Great Northern Tool and Supply Co. as distributors for Lincoln products in Montana and Wyoming. "Stable-Arc" welders, welding supplies and "Lincweld" motors will be distributed in this territory through Great Northern stores and shops in Billings and Kevin, Mont.; Cody and Casper, Wyo. The main office of the company is at Billings; salesmen cover the state of Montana and the northern half of Wyoming.

H. B. SQUIRES CO., San Francisco, has been appointed Pacific Coast representative for the porcelain line of J. H. Parker, New York City. A stock of knobs, tubes, cleats, and similar supplies included in this line will be warehoused in San Francisco, Seattle and Los Angeles.

W. J. DANDURAND has been appointed manager of the radio and refrigeration departments of Goodan-Jenkins Furniture Co., Los Angeles, Calif.

TIDEWATER CROSSARM & CONDUIT CO., which owns plants at Chehalis and Tacoma, Wash., has leased both these to the Eastern Railway & Lumber Co., of Centralia. Until such times as business improves, the Tidewater concern will be supplied with material to fill its orders by the Centralia firm from its plant in that city. Should conditions later warrant, the crossarm factory at Chehalis and the one at Tacoma, both of which have been idle for some months, will again be put into operation.

PARAMOUNT HEATING & MFG. CO., 600 Harrison St., Seattle, recently announced removal of its manufacturing plant to a new one-story brick building at 1716 21st Ave. South. The company manufactures central heating systems, heating and domestic electrical appliances and electric water heaters. Waldo Mather is manager.

HOLOPHANE CO., INC., New York, announces the formation of a new department to extend cooperation and maintain service between power company lighting service bureaus and the Holophane Co. Dave Tuck has been placed in charge of the new department.

AUTOMATIC WASHER DISTRIBUTOR—Associated Electric Co., of Los Angeles, has been added to the list of West Coast distributors of The Automatic Washer Co., Newton, Iowa.

Portland Dealer for Westinghouse Refrigerator

King & Orput, Inc., 182 Sixth St., Portland, is the name of the new distributor-dealer for Westinghouse refrigerators in the Portland metropolitan area and Multnomah County. L. B. King, formerly of Coast Counties Gas & Electric Co., Santa Cruz, Calif., is president and treasurer. Gordon D. Orput, once with Frigidaire Corp. but more recently with the Westinghouse refrigerator dealer in Monterey, Calif., is vice-president and sales manager. The company opened for business May 7.

A retail sales force has been organized and co-dealers will be established in Portland. Fobes Supply Co., with its branches throughout the Northwest, will continue to act as distributor of the Westinghouse refrigerator in the Northwest territory.

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G. E. to Enter Air Conditioning Field

The organization of an air conditioning department within the General Electric Co., which will market various electrical devices for home heating, humidifying and temperature control, has been announced by President Gerard Swope. One of the first products to be marketed by this new department will be a complete oil burning furnace.

J. J. Donovan, of Cleveland, formerly in charge of apartment house refrigeration sales, will be manager of the new department. Headquarters will be maintained at General Electric's New York offices, 120 Broadway.

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KENNETH SHIBLEY, formerly manager for California Filter Co., has been appointed manager of Shibley Co., Inc., Seattle. Shibley Co. is engaged in the water purification business in all its branches, and in addition represents Wallace & Tiernan Co., Inc., Newark, N. J.; Builders Iron Foundry of Providence, R. I., manufacturers of Venturi meters, electric flow meters, filter plant gages and controllers, and special apparatus for hydraulic measurement and recording; Hall Laboratories, Inc., of Pittsburgh, Pa., boiler feed water conditioning; Hagan Corp. of Pittsburgh, Pa.; and Cement Wrapped Pipe Co., Ltd., of San Francisco.

M. G. LANGLOIS, formerly of the Ottawa and Montreal offices of Consolidated Industries Products, Ltd., has been transferred to Vancouver to become Western division manager of the household appliances division of that company, which includes Norge refrigerators and other appliances. Assisting Mr. Langlois as British Columbia representative will be F. G. B. Whitehead, formerly in charge of electric range sales for the B. C. Electric Railway and Hudson's Bay companies.

DE LAVAL PACIFIC CO., 61 Beale St., San Francisco, has been appointed by the King-Seeley Corp., Ann Arbor, Mich., and the Northern Pump Co., Minneapolis, Minn., as their distributor in Washington, Oregon, Idaho, California, Nevada, Alaska, Hawaiian Islands, west coast of Mexico, Japan, China and the Philippines. King-Seeley Corp. manufactures telegages for measuring the contents of tanks or depths of liquids at remote points; Northern Pump Co. is a rotary pump manufacturer.

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"Don't Shoot the Pianist—He's Doing the Best He Can"

Harry Herning, of the Coast Electric Supply Co., San Francisco, in his usual role of piano player for contractor's boat rides, entertained California Electragists on their merry river boat trip to Sacramento early in the year

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FERNAND PINCOFFS CO., 1001 South Hope St., Los Angeles, has been appointed exclusive distributor of Electrochef products in southern California by Electromaster, Inc., according to announcement of Louis R. Swenson, district sales manager. The Pincoffs company is a newcomer in the electric range business. Its president, F. H. Pincoffs, formerly was vice-president and manager of the New Orleans branch of Maurice Pincoffs Co., international importers and exporters. Western Auto Supply Co., Salt Lake City, has been appointed Electrochef distributor in that territory. H. W. Eskuche is president and general manager of the firm, which is distributor of Crosley radio and refrigerators, Mayflower refrigerators and Westinghouse washers and small appliances.

J. F. HINK & SON, Berkeley, Calif., have been appointed exclusive Westinghouse refrigerator distributors in the Berkeley territory. Hink's also sells General Electric and Norge refrigerators.

Market Review

California and Intermountain—

BUSINESS in most sections of the West seems to be slowly—very slowly—coming up from the low levels of March, with a greater proportion of construction and industrial material and a smaller proportion of line material and power machinery. Prices have dipped a little here and there, principally through competitive adjustments, but as a whole they are steadier than at the first of the year.

However, "electrical supplies" still is at the foot of the Federal Reserve report for the Coast, recording 41 per cent below last year, which is a fraction of a point below agricultural implements, and 20 per cent below furniture. Los Angeles building construction for April fell off 55 per cent from last year, and Oakland and San Francisco showed decreases of 80 per cent and 43 per cent respectively, as compared with a national decrease of 70 per cent.

Few big jobs are breaking now, outside of the Stockton and Sacramento Post Offices, requiring respectively about $7,500 and $10,000 of material, but wholesalers' salesmen report an increased tendency to fill up long-vacant shelves and a larger share of package orders. Seasonal orders, such as pumping plants and fans, are still conspicuous by their absence.

Industrial business runs to crop and produce handling facilities, such as a dairy products distribution warehouse for San Francisco, increased wharfage at Stockton, maintenance material for packing plants, and prospective replacement of a $500,000 refrigeration plant at Santa Rosa, just destroyed by fire and essential to the perishable products of that area.

Other business includes bids for wiring staples and supplies for San Francisco's fiscal year beginning July first, and a railroad's similar needs for the next quarter; about 60 open floodlights for local playgrounds, and other high power projectors for nine holes of a San Francisco golf course, though decision to abandon San Francisco night league baseball for a time is a disappointment.

Lumber stocks are said to be low and in need of replenishment. General Electric reports sale of a 2,200-kva. electric steam generator equipment (value $5,500) to a lumber company in northeastern California.

Power company business is exceedingly quiet, being apparently limited to such bare necessities as an occasional carload of weatherproof wire in the mountain area and of guy clamps and crossarms in California. Bids are still pending for about $65,000 of 10,000-kva. transformers for the City of Los Angeles and about $40,000 of switch gear equipment for the new plant of the City of Vernon, Calif.

Other machinery orders include $2,500 of motors and controls for Sac-

ramento water works supply, $1,000 of G.E. traffic signals and equipment for Oakland, three 48-kva. Westinghouse indicating substation feeder regulators (value $5,500) and an 11-kva. outdoor switchhouse for rural service, and $8,000 of G.E. regulators, $4,800 for stock and $4,000 for the Palo Alto area.

Range campaigns, north and south, are active and are going well. Three thousand, five hundred Los Angeles city employees are engaged in a contest to place a higher proportion of ranges among themselves, the bogey being about 500. The Pacific Gas and Electric Co. has a three months' campaign, ending July 1, to sell 1,750 electric ranges and 800 water heaters to consumers of coal, wood and oil, with a scale of trade-in allowances and of flat-price wiring. The first 30 days recorded a sale of 400 ranges and 250 water heaters, which amounts had been increased 60 per cent and 70 per cent, respectively, by mid-May.

Pacific Northwest—

IN Seattle and the Puget Sound district specifically, and the Pacific Northwest generally, business is expected to remain at present levels for at least 90 days. May sales in most lines were considerably below those of the same month last year. Power company buying was mainly of transformers and meters, as needed; lumber mills and allied woodworking plants purchased a few motors for replacements, and industrial buying was at low ebb. Electric range and refrigeration sales were somewhat lighter than during April, and movement of small appliances and radio also showed a decrease. Little activity was shown in schedule materials, or in poles, wire or pole line hardware.

The general building situation was basically unchanged but better weather, it was stated, may encourage more general activity, the volume anticipated including some commercial buildings, residences and modernization of existing business blocks and homes. Lumber production in the Pacific Northwest continues to show a decline and buying from this source is mainly for repairs and replacements only.

One of the larger Seattle jobbers reporting on past month's sales announced movement of approximately 100 transformers, from five to 100 kw., and 500 meters, from 5 to 25 amp., to central stations; 60 motors, from 50 hp. down, to miscellaneous sources; 40 motors from 75 hp. down, to sawmills, woodworking plants and irrigation districts; 35 machines from 25 hp. down to refrigeration sources and small industrials; 40 motors from 15 hp. down to water districts and agricultural sections; and approximately 50 motors, 10 hp. and under, including many fractional sizes, to irrigation districts and small industrial plants.

Collections are said to be from poor to fair.

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Barometer

INDUSTRIAL activity in the Western states continued during April at very nearly the same rate as in March, although variations occurred in individual groups. Though there was a decrease in the computed average, it was too small to be of importance. As in March, the index is 16 per cent lower than at the corresponding time in 1931. Most of the decrease occurred before the middle of last year. Since July the changes have been moderate; the present figure is only 7 per cent below the average for the preceding nine months.

It may be noted in this connection that the average for the United States as a whole was down 5 per cent in April compared with March; conditions in the West are therefore more favorable than in the rest of the country.

Of the eight groups listed, material gains over March were reported for shipbuilding (16 per cent), stone, clay and glass (23 per cent), and chemicals (3 per cent). These were balanced by declines in the food industry, of great importance in this part of the country, in paper and in rubber.

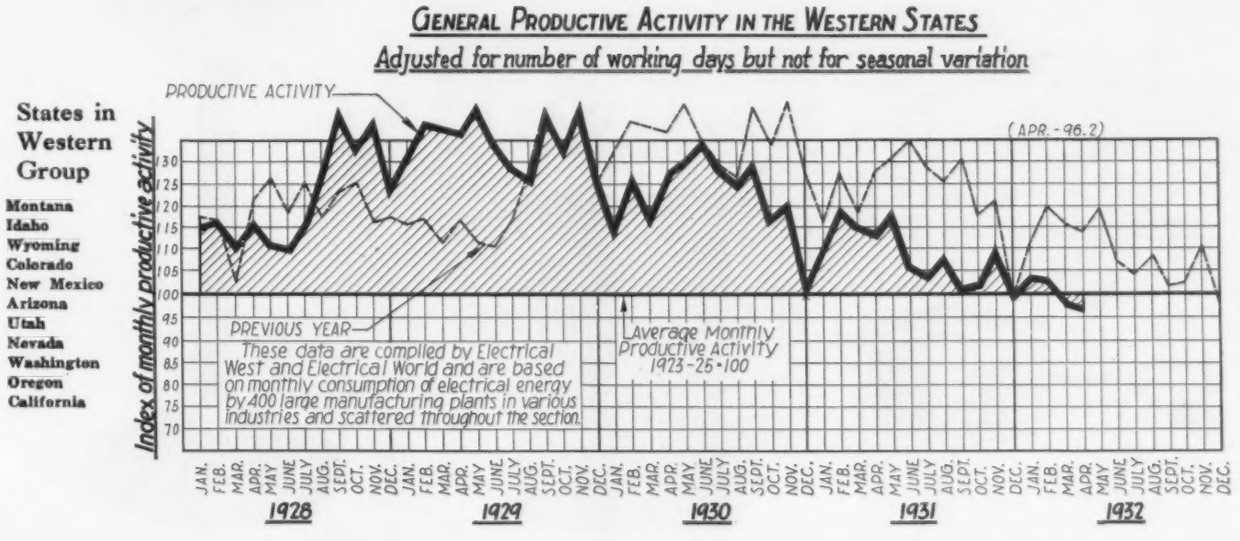
Comparing the present figures with those reported a year ago, it will be seen that three industries show gains, namely chemicals, shipyard activity and paper. Offsetting these were the losses, more or less severe, in the other groups. Among the latter the extreme reduction in the metals group is conspicuous, with a decrease of 38 per cent. Against April, 1929, the decrease amounts to 71 per cent; that is, its operations are at 29 per cent of the rate three years ago. That condition, however, is not confined to the West, it is nation-wide.

Indexes of Manufacturing Activity in the Western States

(All figures adjusted for number of working days)

	April, 1932	March, 1932	February, 1932	April, 1931
All industry	96.2	97.0	103.7	114.0
Chemicals	84.0	81.1*	91.6	75.2
Food	110.8	116.8	127.0	138.1
Forest products	128.0	130.0	135.2	150.1
Metals group	43.8	42.1	49.7	71.4
Paper and pulp	123.1	132.3	121.4	120.6
Rubber	99.0	102.5	98.1	155.6
Shipbuilding	100.7	86.4*	87.4	82.0
Stone, clay and glass	94.6	78.0	80.8	94.6

* Revision.



New Products

Ironmaster

Weighing only 3½ lb., the Sunbeam Ironmaster, a full-size, 1,000-watt iron with free-acting thermostat control, is announced by the Chicago Flexible Shaft Co., Chicago. Tests conducted in laundries and dry-cleaning establishments indicate that less pressure is required to iron satisfactorily with this iron than is necessary with a 6-lb. iron. Duralumin, which has a high heat conductivity, is used for the soleplate and inside pressure plate of this iron, and the heat from the 1,000-watt element is conducted to the surface of the soleplate very rapidly. Thus this iron relies on faster conducted heat to take the place of the extra weight of heavier irons. Low, medium and high heat are obtained by turning the control lever on the top of the iron. The free-acting thermostat is placed close to the bottom of the iron and is set to cut off when the heat reaches 550 deg. F.

Federal Merchandise Co., 316 Commercial St., Los Angeles, serves as factory representative of all Sunbeam products in the West.—ELECTRICAL WEST, June 1, 1932.

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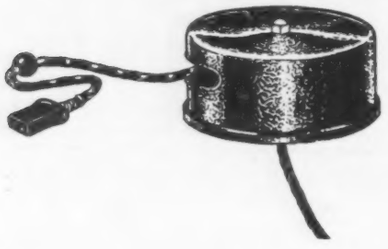
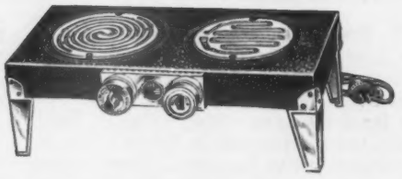
"Roll-a-Way" Cord

A new type of cord for electrical appliances, known as the "Roll-a-Way" cord, has been placed on the market at a popular price by the Trico Fuse Mfg. Co., of Milwaukee, Wis. A super-flexible heating cord rolls back and forth into a spring reel, leaving the proper amount of cord needed. By bringing an adjuster disk into operation the cord can be locked, thus providing an extension cord of any length from 5 to 10 ft.

Although primarily designed for use with electric irons, the "Roll-a-Way" can also be used with toasters, percolators, chafing dishes, waffle irons, etc. By replacing the connection on one end with a socket, a trouble light is available. Or it can be connected directly to portable tools, dictating machines or other devices.

A continuous piece of cord is used so that the length of the cord on either side of the reel can be varied. The standard arrangement provides 5 ft. on each side of the reel.—ELECTRICAL WEST, June 1, 1932.





Two-Burner Hot Plate

A new fast-cooking, two-burner Star-Rite hot plate is announced by The Fitzgerald Mfg. Co., Torrington, Conn. Four different heats are possible with this hot plate—1,000, 500 or 250 watts with the left burner, and 660 watts with the right burner when the left burner is on either medium or low heat. Top and sides are of vitreous enamel, legs and switch plate of chromium plate. Retail price, $6.—ELECTRICAL WEST, June 1, 1932.

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New Voss Washers

Two new washer models have just been introduced by Voss Bros. Mfg. Co., Davenport, Iowa, which, together with the company's model E-59, constitute the Voss line for 1932.

The new model E-76 will feature three exclusive Voss features. It is the first washer with an all-porcelain surface (except wringer and short legs). It has the exclusive Voss corrugated porcelain enameled tub and porcelain enameled lid, and a patented metal floating agitator which duplicates hand-washing action. Other features are: specially designed wringer with 2¼-in. Zeppelin-type rolls; rubber-insulated motor; simple power mechanism with only four moving parts, fully enclosed and running in oil.

Model E-69 offers exactly the same features as the E-76 except for the all-porcelain apron. Retail price of the E-69 is $69.95.

The new Voss "Laundra Kar" is a strong, light-weight clothes basket and clothes-pin carrier, mounted on wheels so it can easily be moved about. The clothes basket is always at a convenient height, eliminating stooping and lifting. It folds up and can be hung on a nail when not in use. Packed in cardboard carton and includes clothes-pin bag. Retail price $2.65; dealer cost, $1.50 f.o.b. Davenport.—ELECTRICAL WEST June 1, 1932.

Duplexalite "Bettalite"

The Duplexalite Division of The Miller Co., Meriden, Conn., announces the Duplexalite Bettalite, available in two designs, especially for low-cost modernizing of old homes having old-fashioned lighting fixtures. This unit screws into a lamp socket in the same manner as a Mazda lamp and uses a 150-watt lamp. It can be used on single-socket chain or cord pendants, requiring no mechanical installation and no wiring.—ELECTRICAL WEST, June 1, 1932.

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Portable Air Conditioner

For home air purification The Swartzbaugh Mfg. Co., Toledo, Ohio, has entered the market with a portable air cooling and air washing fan known as "Klenzair." The device draws the air from the room, washes it through four sprays of water and releases it cool, clean and, in dry atmospheres, humidified. Its capacity is 1,000 cu.ft. of air every ten minutes—sufficient for the average living room, small store room or large office.

The motor used is a 60-cycle (a.c. or d.c.) standard type with bearings designed for continuous service. A two-speed switch makes it possible to regulate the speed to meet conditions. Over-all height is 40 in. The body is of rust-resisting steel, upper structure porcelain enamel with a grain walnut finish, and the lower structure lacquer finished in walnut color. Hardware is chromium plated. Retail price in the West $37.50.—ELECTRICAL WEST, June 1, 1932.

PORTABLE—May be used over stove or elsewhere
BEATERS TILT BACK out of way, batter drips into bowl
UNBREAKABLE BOWLS—Easily removed from stand
CHROMIUM BEATERS—Easily attached and detached
CONVERTIBLE into juice extractor in less than a minute

Mixer and Cleaner

Two new Universal appliances of Landers, Frary & Clark, New Britain, Conn., are a combination mixer, beater and juice extractor and a Model No. 435 vacuum cleaner.

The following are features of the mixer, beater and juicer: three-speed ventilated motor which tilts back and may be lifted from the stand with beaters and used separately; 3-qt. bowl and 1-qt. bowl of extra depth, both of which turn on a revolving platform; and die-cast aluminum juice extractor core.

A patented nozzle, described by the manufacturer as "thread-picking and self-cleaning" is a feature of the No. 435 cleaner. The nozzle creates a flow of air over the top of the rug nap, which draws all litter such as threads, hair or lint immediately into the bag. A utility bristle bar is supplied which clamps quickly and easily to the front of the nozzle when the assistance of a brush is desirable for unusual cleaning jobs such as sidewalks, bare floors and extra-finely woven short-nap rugs. Retail price $24.50.—ELECTRICAL WEST, June 1, 1932.

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Vacuum Contact Relay

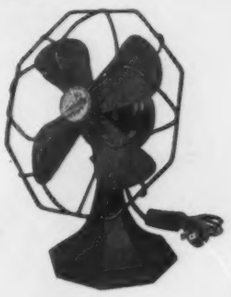
A vacuum contact relay has been added to the line of midget relays manufactured by Ward Leonard Electric Co., Mount Vernon, N. Y. The vacuum contact element, which is actuated by the relay armature, is rated at 8 amp. intermittently and 6 amp. continuously at 220 volts.

Relays equipped with this type of contact are especially applicable to operation in hazardous places and have a high rating, making them a heavy-duty midget relay. They may be obtained for normally open or closed operation. Coils may be wound for 6 to 110 volts a.c. or d.c.—ELECTRICAL WEST, June 1, 1932.

Electric Fan

For sweltering days of the approaching summer the F. A. Smith Mfg. Co., Rochester, N. Y., has brought out the ArcticAire electric fan illustrated.

ArcticAire will not creep along the table or desk, despite the speed of the motor; its doesn't hum, click, buzz or interfere with radio reception, says the manufacturer. Available in a variety of pleasing color combinations, the ArcticAire has an 8-in. non-oscillating fan and induction type motor. Intended retail price is $3.50.—ELECTRICAL WEST, June 1, 1932.



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Two New G-E Washers

To provide a still more complete coverage of the washer market, the General Electric Co., Merchandise Department, Bridgeport, Conn., is bringing out two new washers—Model N, with "Activator," to retail at $99.50, and Model X, listed at $69.50.

Model N, the company points out, is the first "Activator" equipped washer to sell for less than $100. In addition to the "Activator," other important features are the pump and the improved trough-type wringer. The wringer is stream-line in design, with oversize black and white rolls, and is provided with instant pressure safety release. Finish of the washer is blue lacquer, with mottled blue, vitreous enamel porcelain tub.

Model X is of 66-lb. size. It has an agitator with control at the base of the tub. The wringer has 1⅞-in. white rolls and instant pressure safety release lever. Finish of the machine is horizon blue, with tub of vitreous enamel porcelain.

Features of both washers are the permanent lubrication at the factory, free rolling casters, rubber flange on rim of tub to help retain water temperature and prevent lid noises, and all-rubber waterproof cord of generous length. — ELECTRICAL WEST, June 1, 1932.

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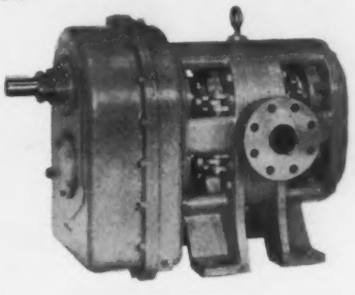
Rotary Pump

De Laval Pacific Co., 61 Beale St., San Francisco, distributor of Northern pumps on the Pacific Coast, announces an entirely new model—the NH Series Cycloid Type, with capacities from 50 to 700 g.p.m. These pumps are manufactured by the Northern Pump Co., Minneapolis, Minn.

Outstanding features of this positive acting unit are extra large stainless steel shafts for heavy duty; ball bearings which do not encounter liquid being pumped; reversible bronze liner plates which may be of any other metal if desired; new type split packing glands easily accessible; built-in gear reduction (spur, herringbone or helical), and hardened and ground synchronizing gears. The whole unit is much more compact and lower in height than former models.—ELECTRICAL WEST, June 1, 1932.



Latest Cinderella

Newest edition of the Cinderella washer is the adaptation of the Cinderella vacuum-action principle to a standard 13-gal. copper wash boiler. This washer has been designed especially for use by families where space limitation or the price of a regulation family washer have hindered their purchasing an electric washing machine. Weight of the washer when empty is but 25 lb., so it can be easily moved. It has a capacity of four double sheets at one time, or 35 to 40 pieces of the average wash. Clothes may be boiled in it if desired. The washer has been priced to sell at $29.50 in the East; about 5 per cent higher in the West. A convenient 10-in. Lovell wringer made especially to fit the copper tub of the washer may be had at small extra cost.—ELECTRICAL WEST, June 1, 1932.

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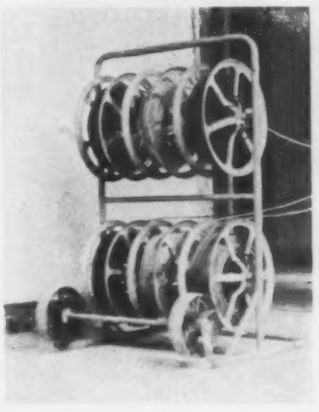
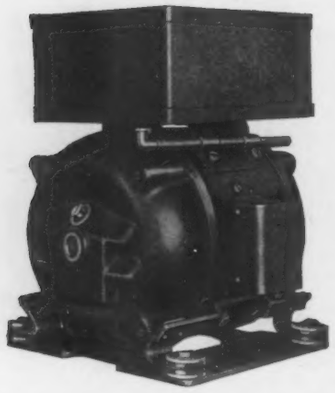


Wire-Pulling Reel

This new multiple wire-pulling reel has been placed on the market by the Smith-Robinson Mfg. Co., 53 Fourth St., Portland. Illustrated is the six-reel type; the device is also made for a greater or less number of reels. A non-turning shaft carries each gang of reels, and drops into slots in the upright members of the frame, so that each gang of reels can be lifted out intact. Each reel is provided with a collar-hub which turns on the main shaft, and is equipped with a thumb-screw brake designed so as not to wear the shaft. By means of this brake just the desired tension can be put on the wire. Each wire reel has an adjustable expanding core so as to fit the inside diameter of any wire coil. It is a matter of moments to lift out the gang, disengage the sides of an individual reel and insert a new coil. The whole device, even when loaded with full coils, is easily moved from place to place by simply tipping it back onto the wheels and pushing as a truck would be pushed. The inventor and manufacturer asserts that the time of one man can be saved on a heavy wire-pulling job since nobody need be in attendance at the coils to pay out wire. Nor is there any annoyance from kinking wires and snarling coils.—ELECTRICAL WEST, June 1, 1932.



Capacitor Motors

Supplementing its other lines of single-phase motors, Century Electric Co., St. Louis, Mo., has recently offered a line of capacitor motors in sizes from 1/6 to 10 hp., furnished for single or multi-speed operation with normal torque, high torque or low torque characteristics.

The small sizes have the capacitor box mounted on the top of the motor, although the boxes can be furnished for wall mounting as in the larger sizes. The integral sizes have a separate capacitor box, which may be furnished for either wall or floor mounting.

Operating characteristics cover a wide range of applications, from the direct-connected fan to the more exacting service required for oil burners and refrigerators. —ELECTRICAL WEST, June 1, 1932.

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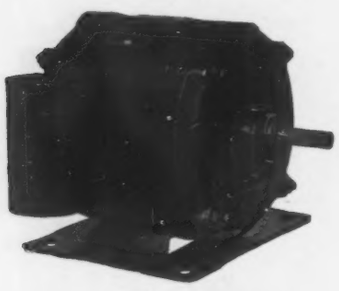

Split-Phase Motors

Two split-phase motors in the line manufactured by Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo., have been redesigned for ultra-quiet, vibrationless, cool and trouble-free operation.

New features of these motors, designated at 44RB (1/30 and 1/20 hp.) and 56RB (⅛, 1/6 and ¼ hp.) are drip-proof endplates, liberal wool-yarn lubrication, handy conduit box adjustable in four positions and redesigned switching mechanism on the 44RB.—ELECTRICAL WEST, June 1, 1932.

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General Electric Clocks

Two new models of General Electric-Telechron electric clocks to sell at low prices are announced by the Merchandise Department of the General Electric Co., Bridgeport, Conn.

Model AB-330 is a small desk clock of colonial design, with a mahogany case and polished lacquered finish, and a gold finished ornament on the top of the case. The 3-in. dial is finished in ivory enamel and has antique Arabic numerals. The hour and minute hands are of blued steel and the sweep second hand is brass. The dimensions of this model are: height, 5 in.; depth, 3¼ in.; width, 4⅝ in. An 8-ft. cord is attached. List price complete, $5.95.

Kitchen clock model AB-458 has a round, die cast Dura-metal case, finished in enamel lacquer, and having a detachable hanger. This model is obtainable in four colors—medium green, ivory, white and medium blue. The 4½-in. dial is finished in cream enamel and has Arabic numerals. The dimensions of this model are: diameter, 7⅞ in., depth, 3⅞ in. A 6-ft. cord is attached. List price complete, $5.50.—ELECTRICAL WEST, June 1, 1932.

Portable Transformer

A portable transformer for drills and other electric hand tools has just been made available by the Jeffries Transformer Co., 5706 Long Beach Ave., Los Angeles. The instrument is rated at 500 watts, intermittent duty, 50 or 60 cycles, 220/110 volts, and will operate a ⅝-in. drill in steel or larger drills in other materials. Finished in polished aluminum and weighing 18 lb., the transformer comes equipped with a leather carrying handle and a 10-ft. heavy-duty cord with rubber-shielded clips for attaching to the 220-volt power circuit. A receptacle is mounted in the transformer to receive the plug of the drill or other tool.—ELECTRICAL WEST, June 1, 1932.

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Receipting Coupon Cutter

A new model of a receipting coupon cutter that has been used for many years by the offices of electric light and power companies has been developed by the A. C. Gibson Co., Buffalo, N. Y. The new models show the head of the machine to be one complete casting. The receipting block also is of a new design. It is slid into the holder easily and is pulled out when the cashier leaves his cage. Another cashier may enter that cage and insert his receipting block and begin work immediately. The interchangeableness of this new model is a great improvement over the old style in which the spring clips held the blocks in place. The small drawer carries the rubber type dates conveniently so that date changes may be made quickly each morning. All new models are furnished in chrome and nickel, the top or table being of stainless steel, and all boxes are finished in walnut.—ELECTRICAL WEST, June 1, 1932.

Two ABC Washers With Automatic Drain Pumps

Announcement was made last month by Altorfer Bros. Co., Peoria, Ill., of two new ABC washers, both of which are equipped with an automatic drain pump.

The new ABC Liberty is a wringer-type low-priced washer, finished in two tones of grey with grey stippled porcelain tub. This washer has over-size balloon rolls on the wringer, standard polished aluminum agitator and full 55-lb. capacity. The enclosed gear mechanism is sealed in a permanent bath of oil. The automatic drain pump eliminates the necessity of lifting and carrying heavy pails of water when emptying the washer. Retail price in the West, $85.50.

The ABC 1933 World's Fair spinner model No. 75, also equipped with an automatic drain pump, washes, rinses, blues, starches and dries the clothes for the line. Spinner tub and drier basket are finished in a two-tone shade of light green with beige stippled tub. This model retails for $155 in the West.—ELECTRICAL WEST, June 1, 1932.

Trade Literature

¶ FLOODLIGHTING HANDBOOK—A 28-page handbook on "Floodlighting," No. 777, has recently been published by Curtis Lighting, Inc., of Chicago. Easily understandable descriptive matter and drawings show the complete light control required of floodlighting projectors and how each of the four sizes of units (250, 500, 750, 1,000 and 1,500 watts) provides this with either white or colored lighting effects. The book is illustrated with actual photographs of every kind of floodlighting installation, and the wattage and type of equipment used is explained for each. Line drawings show locations for mounting units and scale details.

¶ DEAD-FRONT CONTROL EQUIPMENT—Roller-Smith Co., 233 Broadway, New York, has published Catalog No. 5, covering open and enclosed air circuit breakers; attachments and accessories of all kinds; relays; and sectional steel, dead-front switchboards and cubicles, a new product.

¶ IMMERSION HEATING UNITS—The Latest "Falcon" bulletin of H. O. Swoboda, Inc., 3530 Forbes St., Pittsburgh, Pa., illustrates and describes "Falcon" bare electric immersion heating units suitable for large tanks used in connection with asphalt, tar, compound, varnish, oil and similar viscous materials which are electrical insulators.

¶ INSTRUMENT TRANSFORMERS—Catalog No. GEA-601D recently released by General Electric Co. covers the company's complete line of instrument transformers.

¶ WORTHINGTON PUMP PUBLICATIONS—Among catalogs and bulletins recently issued by the Worthington Pump and Machinery Corp., Harrison, N. J., are five bulletins on stationary diesel engines of the four-cycle, direct-injection type. Vertical sump and irrigation pumps are described in a bulletin giving cross-section views and a table of capacities and sizes. Another recent bulletin is devoted to this company's "Monobloc" type centrifugal pumps.

¶ RHEOSTATS—Rheostat Bulletin No. 12, recently released by the Ohmite Mfg. Co., 636 North Albany Ave., Chicago, is an eight-page booklet illustrating and describing models J and L Ohmite all-porcelain rheostats.

¶ BLOWING TIME OF FUSES—Charts showing results of tests to determine the blowing time at various heavy overloads of fuses manufactured by the Bussman Mfg. Co., St. Louis, are obtainable from that company without charge.

¶ FIRST AID KITS—A descriptive circular of First Aid kits and refills put up by E. D. Bullard Co., of Chicago, is available through the company's Western headquarters at 275 Eighth St., San Francisco, or its branch offices at 271 H St., Salt Lake City and 935 Santa Fe Ave., Los Angeles.

Millions will Listen,,

To Frigidaire's New **Nation-wide**

Powerful Advertising . . .

makes Frigidaire easier to sell

1932 inaugurates the most extensive advertising and selling program in Frigidaire history. Big space in local newspapers! Color pages and spreads in national magazines! And a nation-wide radio program, three evenings a week, over 57 stations.

Millions will read about Frigidaire. Millions will hear about Frigidaire. Hundreds and hundreds of good prospects will be attracted to Public Utilities' showrooms.

There are now more than 2,000,000 satisfied users of Frigidaire. Such outstanding public preference has been won because only Frigidaire offers *all* the features of *Advanced Refrigeration.* One of the most important of these features is SUPER POWER. That means more ice . . . fresher vegetables . . . faster freezing of salads and desserts . . . safer, more dependable refrigeration at all times.

Get behind this complete line of easy-to-sell refrigerators. Make a special drive on Frigidaire now, while this big advertising program is in full force. Frigidaire Corporation, Subsidiary of General Motors Corporation, Dayton, Ohio.

Radio Program . . .

THREE EVENINGS A WEEK! During three weeks in December, 1931, more than three hundred thousand people visited dealers' showrooms in response to the Frigidaire program. The Frigidairians are now on the air again . . . three evenings a week, over 57 stations, coast-to-coast. Frigidaire radio programs are specifically designed to bring people into showrooms for demonstrations. Thousands of new prospects will be developed in this way.

Millions Will Be Reached!

Color pages and spreads will be consistently used in all the leading national magazines. Big space advertising in local newspapers is also on Frigidaire's program for 1932.

FRIGIDAIRE

A GENERAL MOTORS VALUE

These Plans Sell *Hundreds of* Frigidaires *for* UTILITIES

Last year many Utilities sold Frigidaires by the hundreds as a result of Frigidaire Individualized Sales Service Plans. These plans are made to fit exactly the requirements of each utility company . . . they harmonize perfectly with company policy. They are complete in every sense, yet simple and easy to use.

Let us help you. We maintain a special force of trained Sales Promotion men. They are constantly in touch with Utility executives and are available to you whenever you need assistance in preparing and executing a special sales plan. A letter will bring you complete information. There is no obligation. Write today. Frigidaire Corporation, Subsidiary of General Motors Corporation, Dayton, Ohio.

FRIGIDAIRE

A GENERAL MOTORS VALUE

. . . Now is the time to
Close Refrigeration Orders

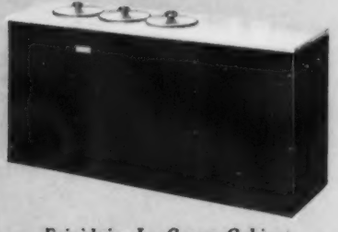
FRIGIDAIRE'S PEAK S

BUILD VOLUME WITH FRIGIDAIRE! No other line offers Utilities so many products to sell—so great an opportunity for profit. In addition to the complete line of household Frigidaires, there are Water Coolers, Milk Cooling equipment, Air Conditioners and refrigerating equipment for all types of commercial needs, including meat markets, groceries, restaurants, hotels and institutions.

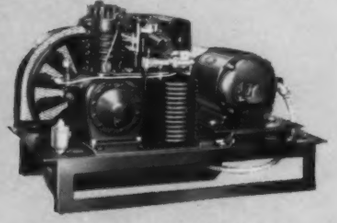
Selling Period Arrives

Frigidaire Water Cooler
Beautiful in design, quiet and economical in operation. Keeps water at just-right temperature, always cold and refreshing.

Frigidaire Air Conditioner
Finished in burled walnut lacquer on steel. Replaces the regular steam or hot water radiator and radiates warm, moist air in winter and cool, dry air in summer.



Frigidaire Ice Cream Cabinet
Various sizes, from a 2-hole to a 12-hole. Designed for economy and long life. Extra heavy insulation throughout. Temperature thermostatically controlled.



Frigidaire Two-Cylinder Compressor
Two cylinders instead of one provide *super power* to meet all refrigeration needs. Runs more slowly, more economically, more quietly and without vibration.

The Known Value... the Guaranteed Performance ... the New Low Prices now make Frigidaire

Easier to Sell

No line offers you so many opportunities for Sales... Build your Volume with Frigidaire

Summer's here. And it's getting hot. Milk will sour. Butter will melt. Vegetables will wilt. Meats and other perishables will spoil. These things—like nothing else—will make people want mechanical refrigeration. The peak selling period for Frigidaire equipment has arrived! This year go after volume with Frigidaire. Every home, every store is a prospect for Frigidaire.

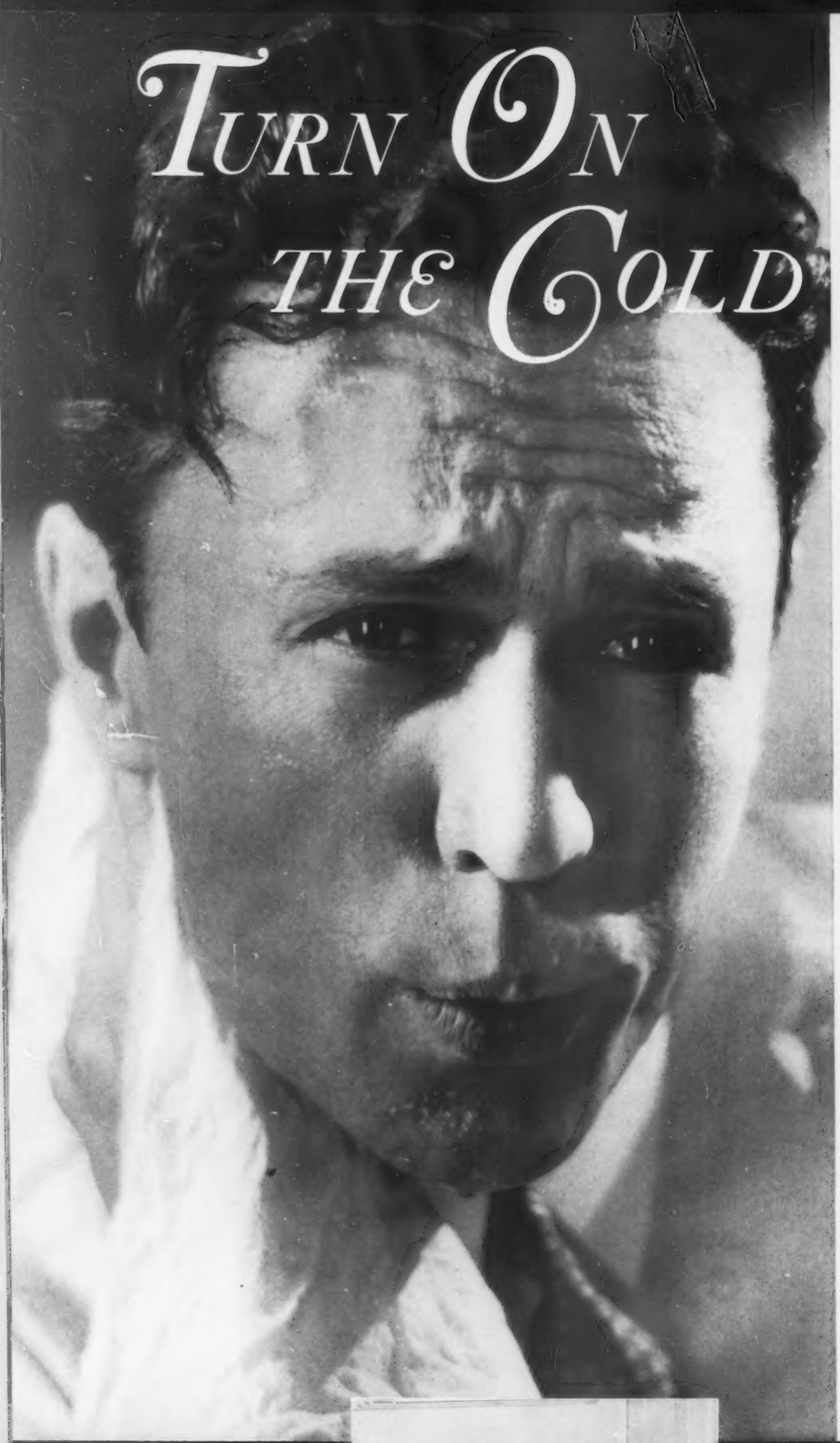
And this year, to make Frigidaire still easier to sell, new important policy changes have been adopted. The entire line of Frigidaire household models has been reduced in price—the lowest in Frigidaire history. You can now offer a genuine Frigidaire—the 4 cu. ft. Moraine Model—for as little as $130 f. o. b. Dayton.

Here is big news, indeed. It's the first time a refrigerator of known value, backed by a reliable company, has sold for so little money.

We urge public utility officials to consider the possibilities for volume and profits by putting a special drive behind Frigidaire. Let us tell you about our Individualized Sales Service Plan for Power Companies. Many Utilities have sold hundreds of Frigidaires as a result of these plans. We'll be glad to prepare a complete campaign for your company now. Write for details. Frigidaire Corporation, Subsidiary of General Motors Corporation, Dayton, Ohio.

Frigidaire

A GENERAL MOTORS VALUE



TURN ON THE COLD

Frigidaire now offers AIR CONDITIONING ...a brand-new field FOR PROFITS

Here is a vast new profit field for Power Companies. Frigidaire has pioneered in air conditioning and is now ready with a remarkable unit that makes a long dreamed of possibility an amazing reality.

In summer this compact Frigidaire unit will refrigerate the air and remove humidity. In winter, the Frigidaire Air Conditioner, when connected to steam or hot water lines, will moisten the air and throw out even more heat than the ordinary radiator. Frigidaire provides winter comfort and summer comfort with the *same unit.*

When desired, Frigidaire units may be installed with no connection to heating plants. Compressors can be located remotely or in the same room.

This new line of Frigidaire Air Refrigerating and Conditioning Equipment has already aroused unusual interest. Utility officials in Atlantic City, June 5th to 10th, are invited to view the display of these products on the Steel Pier, at the General Motors Permanent Exhibit. Prepare now to get your share of air conditioning profits this year. Write for details. Frigidaire Corporation, Subsidiary of General Motors Corporation, Dayton, O.

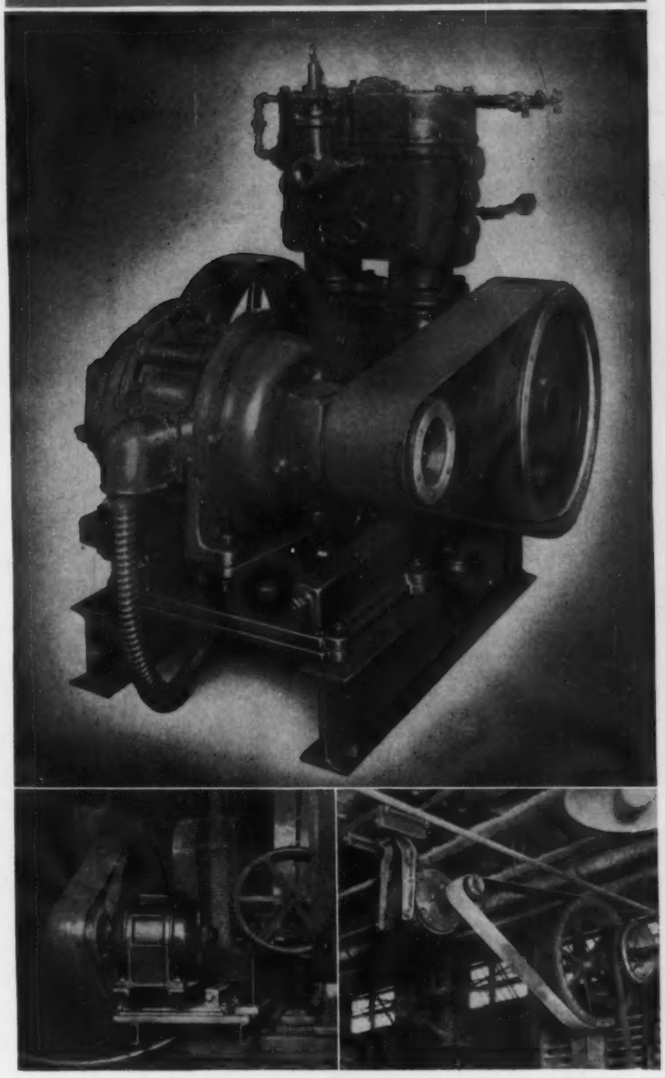
Frigidaire Air Conditioner, Model V-3. Finished in burled walnut lacquer on steel. Beautiful and compact in design. Can be used either as cooling and dehumidifying unit or as 4-Way Conditioner which affords both winter and summer comfort.

FRIGIDAIRE

REFRIGERATED AIR SYSTEM

ROCKWOOD DRIVE

SHORT-CENTER FLAT BELT



THE SUPERIOR PERFORMANCE

of ROCKWOOD Short-Center Drives, demonstrated by thousands of installations, is added proof of the exceptional qualities of ROCKWOOD PULLEYS THAT PULL!

Pulley ratios as great as 8 to 1 between extremely short-center distances! Remarkably small arcs of contact! Short belts running at speeds as high as 6,500 feet per minute! Unusually low belt tension! Could any more exacting tests be devised to show real pulley performance?

ROCKWOOD PULLEYS THAT PULL have a transmitting capacity greater than any other type of pulley—greater than wood pulleys; greater than steel pulleys; far greater than any iron pulley! Because they are perfectly balanced and true-running, they can be run at speeds impractical for other pulleys! Because of their unequalled ability to GRIP and PULL a belt, they require less tension, prolonging the life of belt and bearings!

Millions of ROCKWOOD PULLEYS are in daily service throughout the world—on motors, engines, line shafts and driven machines. Each year, hundreds of thousands more are placed in service in all fields of industry, for new machines and new drives . . . Make your machines produce more with these highly efficient pulleys. More than 2,500 stock sizes—1½ to 72 inch diameters. Complete service stocks in all principal cities. Immediate delivery! Mail coupon below for convenient reference books.

ROCKWOOD

PULLEYS THAT PULL

THE ROCKWOOD MANUFACTURING CO., INDIANAPOLIS, INDIANA—THE OHIO VALLEY PULLEY WORKS, MAYSVILLE, KENTUCKY

Please send books checked. J-32

☐ Specifications of 2,540 stock sizes, ROCKWOOD PULLEYS THAT PULL.

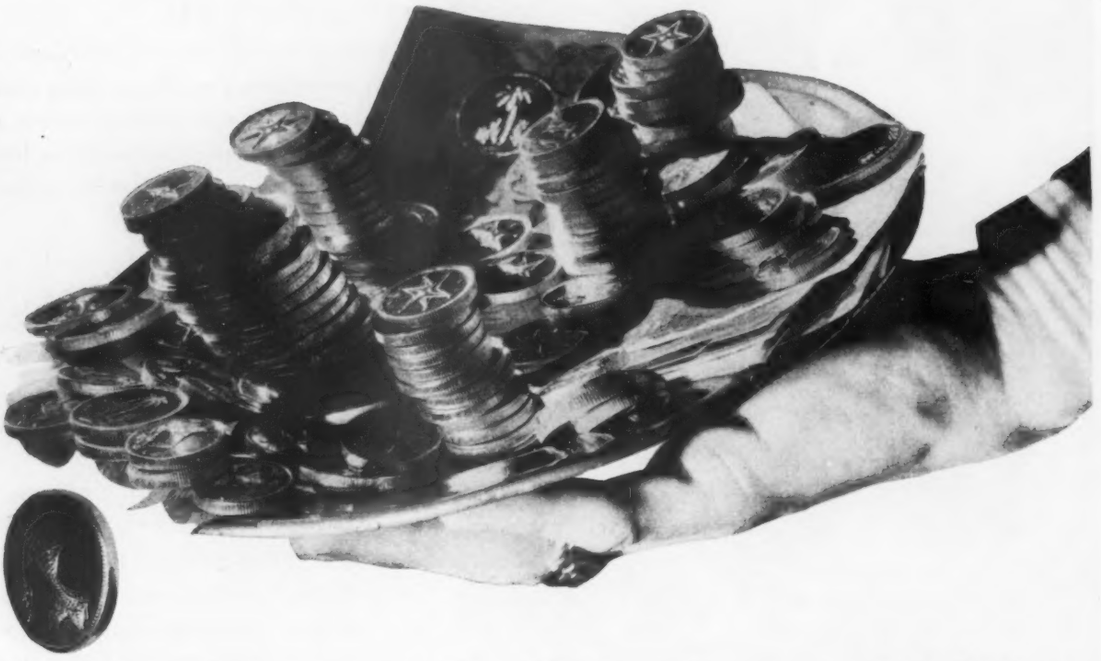
☐ Specifications of stock ROCKWOOD Short-Center Drives from 1 to 100 h.p.

NAME.....

COMPANY.....

ADDRESS.....

Profits on a Platter!



Here's some heart-to-heart man talk we'd like to have you read:

A profit is a funny animal. It's here today, gone tomorrow. That nice Mrs. Harrington who dropped in to buy the toaster your sales department didn't stock was more than a customer. She was a profit. She bought that toaster elsewhere, and your profit went with the sale.

The most we, as manufacturers, can do is manufacture potential profits. We can create demand that pulls women into your stores. We can create merchandise that meets the demand. We can, so to speak, route sales through you. But we cannot do your *selling*. *That* you have to do yourself.

We have harnessed a $2,000,000-per-year campaign to a seasoned distributor-dealer organization which, while making its own sales volume and its own profits and letting you make yours, will contribute to your lines millions of new kilowatt hours. We have mobilized our resources for the manufacture not only of ranges, but of potential kilowatt hours and of *sales*. *Somebody* is going to *get* those sales. Somebody is going to get *your share* of those sales. *You?*

Here is profit on a platter, with all the fixings. A phone call to the nearest distributor, or a quick wire to us, will safeguard the profits we want you to have. The next move's yours.

Selling Points? Man!

Quicker—Calrod, the famous million dollar General Electric Hi-Speed Heating Unit, boils *ten* pounds of potatoes in *one-half* hour!

Cheaper— Calrod cooking averages less than 1c per meal per person. Food *cannot burn*, loses little bulk, goes 20% further. Current is actually *on* only one-eighth cooking time. No burnt-out pots and pans. No sooty walls, no re-decorating of home or kitchen. All due to the flamelessness of Calrod! Minimum servicing and replacements. And the *Range* lasts a lifetime!

Cleaner— Flameless, sealed-in-steel Calrod eliminates soot. Rub a used utensil bottom on white chiffon—without leaving a mark! And how clean kitchen walls stay!

Easier—Automatic temperature control and timing, plus Calrod efficiency, now perform the housewife's drudgery. Now she puts on a dinner—roast, vegetables, dessert—leaves it at twelve, returns at six; her dinner is ready! *Automatically*, in her absence, it cooked itself in an hour! Calrod adds scientific certainty to cooking skill. Heat is automatic, even, *controlled*.

Cooler—Calrod minimizes heat radiation. As potatoes boil, place your hands on the utensil's sides. You will not be burned. Calrod *does not raise kitchen temperature*.

Better—Calrod sears entire meat simultaneously, sealing in flavors and juices. Vegetables retain flavor, vitamins, mineral content. All foods retain color, *look* better, *taste* better, *are* better.

Drudgeless—No drudgery. Automatic as turning an electric switch—and as *sure*. No pots and pans to scour. No bending over a hot range. No endless steps to baste or "peek." No *watchful waiting*. Calrod does the basting and watching. *It will not burn your food.*

Odorless—Cook onions, sauerkraut, cauliflower, peas—your home remains free of cooking smells. Cook them *together* in a single utensil, with no mingling of flavor.

Safer— Calrod *flamelessness* eliminates fire hazard, burnouts, "kitchen headache." Calrod heat is *sanitary* as *sunshine*.

* * *

Think of the sheer power of $2,000,000 . . . pages, spreads, color-spreads in 10 great national magazines . . . a weekly chain program over 53 stations of the N. B. C. . . . cooperative newspaper advertising . . . direct-mail campaigns, outdoor campaigns, dealer helps, canvasser helps, door-openers, cooking schools, displays . . . **And above all, General Electric Hotpoint—the best known name in the industry.** ***. . . There isn't time for a coupon. Wire now!***

What Is Calrod?

The famous million dollar General Electric invention, the Calrod Hi-Speed Heating Unit, is manufactured *exclusively* by General Electric. Calrod is practically indestructible; it is the *only* heating unit capable of withstanding indefinitely the wear and tear of domestic use. The process by which the electric insulator and heat conductor, magnesium oxide is sealed with the resistance coil in a protective steel casing, is controlled under basic patents held by General Electric, as is the entire process by which this type of unit is manufactured.

GENERAL ELECTRIC

Hotpoint

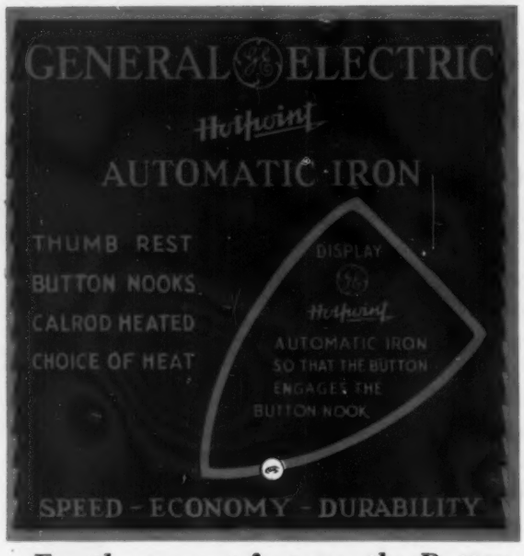
EDISON GENERAL ELECTRIC APPLIANCE CO., Inc.
5676 W. Taylor Street, Chicago

MAN, IT'S A

THIS NEW AUTOMATIC IRON GIVES *MORE* AND COSTS *LESS!*

5 Big Features for $6.80 in G-E Hotpoint A-C-Matic Iron

(for alternating current only)



Just what you need for after-Christmas business... an item that gives so much for so little, that no woman can resist it.

Note the five big features: Thumb Rest . . . Button Nooks . . . Calrod Heating Element . . . More than a dozen ironing temperatures can be selected . . . Attached heel rest.

Get in touch with your Hotpoint distributor today. He is ready to make delivery at once.

For the newest feature, the Button Nooks, we offer you this sales help:

FREE

Heavy wool felt display pad, 11½ x 12 inches . . . deep blue with burnt orange decoration. A button already sewed on, fits into one of the button nooks, giving perfect demonstration of their usefulness. Free with your order for six A-C-Matic Irons.

GENERAL ELECTRIC
Hotpoint Automatic Iron

MERCHANDISE DEPARTMENT, SECTION E-391 GENERAL ELECTRIC COMPANY BRIDGEPORT, CONN.

NATURAL!

Attached Heel Rest. To tip the iron back, instead of having to lift it to holder. Unusually sturdy. Finished in chromeplate, as are all exposed metal parts of this iron.

Thumb Rest. Eases strain on hand, wrist, arm and shoulder. An exclusive G-E Hotpoint feature.

Calrod Heating Element. The very heart of Hotpoint's popularity. Heating element, pressure plate and soleplate are cast in one compact unit, heating element near surface meaning quicker heat.

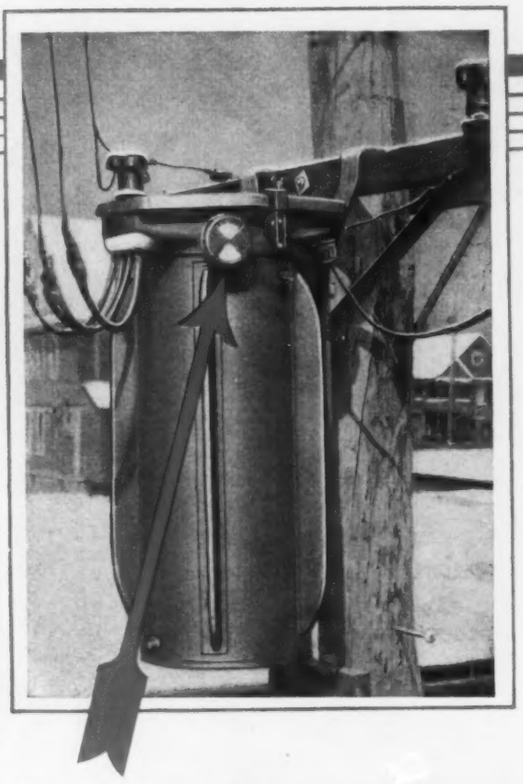
$6.80

Fully Automatic. Adjustable, automatic temperature control. More than a dozen temperatures. For ironing dry and damp pieces . . . heavy and thin pieces . . . and all different materials.

Two Button Nooks. One on each side. For ironing around and under buttons. Another exclusive feature, and enough in itself to sell the iron.

Women Are Already Hearing About This Iron . . . through the "G-E-Circle" Radio Program, which goes into their homes every week day except Saturday, at 12 Noon, and on Sundays at 5:30 P.M. Eastern Standard Time.

(Right) Cat. No. 8K1A1, pole type, with overload signal tripped. (Below) Cat. No. 8K2A1, for subway and large distribution transformers, showing partial load registration



Do you KNOW the margin of available capacity?

WHY not be certain of the efficiency of application of your distribution transformers? The Thermotel SHOWS AT A GLANCE* the relation between the load requirement and the available transformer capacity. Installed on each transformer, it will help you prepare for the winter peak and prevent interruptions to service.

You can apply the new Thermotel to G-E distribution transformers as small as 5 kv-a. and as large as 200 kv-a. Adjustment for transformers of different size is effected simply by shifting an external lever. Installation requires but a few minutes.

Thermotels are more fully described in Bulletin GEA-309. They are available for immediate shipment from our district warehouses.

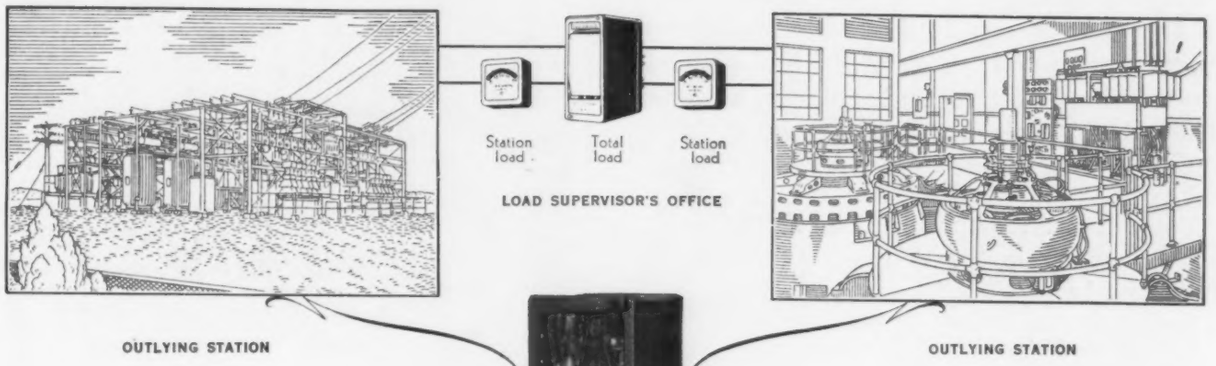
*The Thermotel indicates directly the per cent of available transformer capacity actually being used. This is possible because the Thermotel automatically corrects for ambient temperature.

405-33

GENERAL ELECTRIC

JOIN THE 'G-E CIRCLE'—SUNDAYS AT 5:30 P.M. E.S.T. ON N.B.C. NETWORK OF 54 STATIONS—WEEK-DAYS (EXCEPT SATURDAY) AT NOON

You can telemeter remote stations at instrument speed and accuracy



TELEMETER

NOW your load supervisor can read the instrument values recorded in distant stations—right in his office, and practically instantaneously. The torque-balance telemetering system—one of the most recent General Electric switchgear developments—operates at instrument speed and accuracy over a distance up to 100 miles, and requires only two wires, of telephone size, for the transmission.

It will indicate and record volts, amperes, and watts, either a-c. or d-c.; a-c. reactive volt-amperes; pressure of gas, oil, and water; levels of liquids; gate position; or any other condition that produces torque.

Torque-balance telemetering equipment when used in conjunction with supervisory control can be operated over the supervisory wires. Such a combination provides maximum efficiency of system control and indication at a centralized place. Ask the nearest G-E office for publication GEA-1438 and consider the detailed advantages of this General Electric achievement.

JOIN THE "G-E CIRCLE" — SUNDAYS AT 5:30 P.M. E.S.T ON N.B.C. NETWORK OF 54 STATIONS — WEEK-DAYS (EXCEPT SATURDAY) AT NOON

910-7

GENERAL ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

Showmanship *Sells* Goods

LONG before the circus comes to town the billboards, newspapers and barnsides blaze its coming in colors green and red. The town is plastered with elephants, man-eating gorillas and painted clowns. Everyone is aware that the greatest show on earth is to arrive soon.

When electric appliances are to be sold, should we conduct a whispering campaign? Or should we shout from the housetops?

P. G. and E. advertising in newspapers, billboards and in the windows, blazes the announcement of goods for sale. Their size and style of make-up is their showmanship. In addition, the advertisements are built upon sound selling sense, salesmanship in print. They also say, "See the local stores." That's where you come in. Use tie-in advertisements and tell the public WHERE they can buy.

Dealers who identify themselves by advertising in adjoining space, obtain prospects created by P. G. and E. advertising.

This Company's 1932 advertising will continue to promote the advantages of electrical appliances and to advise prospects to visit their dealers' stores. Dealers who tied in with P. G. and E. advertising during 1931, are planning to continue this method of increasing their sales.

Should you desire to increase your profits, as others are doing, it will be worth your while to try tie-in advertising. Your local newspaper will gladly give you the publication dates of our advertisements.

PACIFIC GAS AND ELECTRIC COMPANY

P·G·and E·

Owned · Operated · Managed
by Californians

EW-101-132

Samples of Tie-in Advertising

PEFFER
A COPELAND Electric Refrigerator for Christmas
DON'T PAY A CENT DOWN
This Christmas Gift saves $50.00 to $150.00 a year on food....
An electric refrigerator is a wise investment!
DOG LOSES IN WOLGAST BOUT
See the SIDELINES
UNBIASED COMPARISON OF LEADING MAKES OF ELECTRIC REFRIGERATORS
BREUNERS
PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
MAJESTIC from the MALLETT MUSIC CO.

MODEL 1236

New Standard Electric Cabinet Range

A range modern in style . . . handsome in appearance . . . featured by unique Plate Warmer and Switch Panel arrangement . .

Standard presents its new Model 1236 as a range of exceptional beauty and selling appeal.

The cabinet idea has been developed on unusual lines, with full regard for modern design but adhering at the same time to practical requirements.

* * *

The following features are worthy of special attention—

OVEN is 16″x18″x14″. The panel on top of oven is a separate panel which will always stay cool. The range is designed to allow large oven cooking space, of which full advantage is taken by use of recessed burners. Oven is aluminum lined.

COOKING TOP has three variable arrangements—four 8-inch burners, or three 8-inch and one 6-inch, or two 8-inch, one 6-inch and one unit cooker.

PLATE WARMER is equipped with low wattage burner controlled by off - and - on toggle switch. This warming compartment is a novel feature which greatly increases the convenience and usefulness of the range.

SWITCH PANEL provides a neat arrangement of switches and is finished to match the range.

FINISH white or ivory with marbleized panels.

* * *

The new Model 1236 is priced to offer extreme value in a range of exceptional character, and of the quality associated with the name Standard—a name that represents the longest experience in the whole field of electric range manufacture. Ask for full details.

The Standard Catalog

is a mine of valuable information on electrical cooking equipment for every purpose. . . If you haven't a copy . . ask for it!

Standard
ELECTRIC RANGES

THE STANDARD ELECTRIC STOVE COMPANY, TOLEDO, OHIO
WM. P. SWARTZ, *Western Sales Representative, 629 So. Serrano Ave., Los Angeles*

LISTENWALTER & GOUGH, INC., *Distributors*
LOS ANGELES **SAN FRANCISCO**

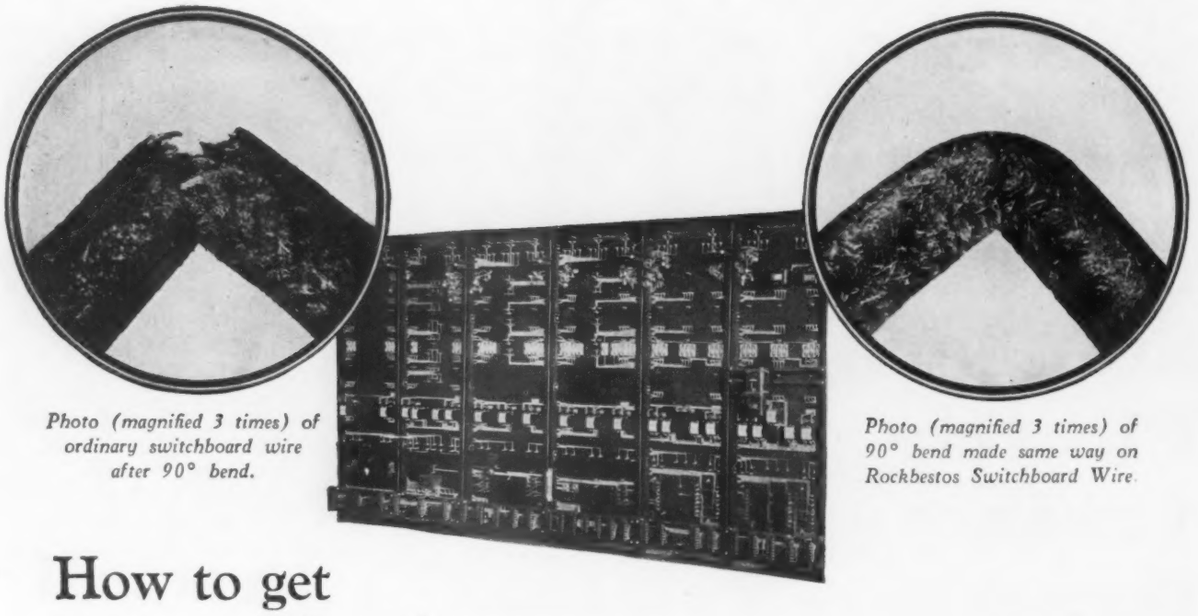


Photo (magnified 3 times) of ordinary switchboard wire after 90° bend.

Photo (magnified 3 times) of 90° bend made same way on Rockbestos Switchboard Wire.

How to get Fine Appearance in Switchboard Wiring

YOU'VE seen them and so have we—beautifully wired boards, every bend square, every wire malleted flat, a perfect cleating job—and every bend cracked on the outside!

Yet this can be avoided. Here's how:

The photographs show what happens when a perfectly square, 90° bend is made in two kinds of switchboard wire.

In the left circle is shown what can happen to ordinary switchboard wire. The photograph was taken after a sharp bend was made by hand with a pair of duckbill pliers. In justice to this type of wire, we want to say that this usually doesn't happen, at least as badly, if the wire is new and the cambric fresh. It usually does happen, however, if the wire is old—has lain a long time in stock, perhaps.

Now in the circle on the right is shown the same kind of bend, made the same way, on ROCKBESTOS Switchboard Wire. This is *always* the result, no matter how old the wire may be.

That's because ROCKBESTOS Switchboard Wire is built differently from ordinary wire as you can see by the cut. Over the two v.c. tapes is a felted, impregnated wall of asbestos. This wall is tightly covered by the cotton finish braid, and it "gives" slightly when sharp bends are made so that the braid is not forced to open or break.

No matter how sharp you make bends, you cannot crack ROCKBESTOS Switchboard Wire. Thus you insure fine appearance on the completed board.

Be sure to get a sample and try it out. A generous length will be mailed if you will fill out and send the handy coupon. As the first step in getting better appearance in your boards, why not do this right now? Mail to ROCKBESTOS Products Corporation, 325 Nicoll Street, New Haven, Conn.

WEST COAST OFFICES

260 Ninth St., San Francisco — 430 Colyton St., Los Angeles — 914 1st Avenue So., Seattle

ROCKBESTOS—*the wire with permanent insulation*

Rockbestos Products Corp., 325 Nicoll St., New Haven

I'd like to try a few bends myself. Please send me a sample of your Switchboard Wire. No obligation, of course.

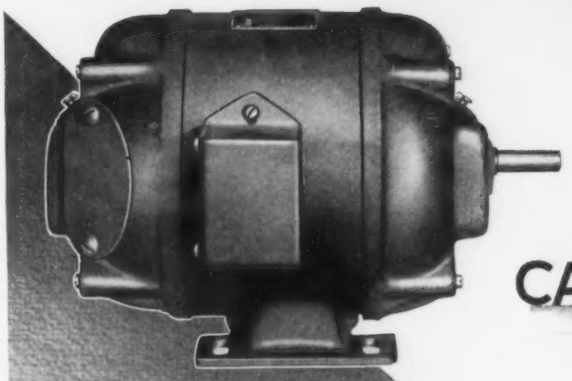
*Name*_____

*Title*_____

*Company*_____

*Address*_____

WAY BACK WHEN - -



CARBONATORS
SMALL PUMPS
REFRIGERATORS
OIL BURNERS

1/6 Horse Power Century Type RS Repulsion Start Induction Single Phase 60 Cycle, 1750 R. P. M. Motor. Built in standard horse power ratings from 1/8 to 40 horse power.

In 1914 . . . when refrigerators were first being developed requiring a different motor than was then in common use . . . When manufacturers of carbonators and some types of small pumps were commencing to feel the need of a motor more suited to their requirements . . . When Central Stations were bothered with high starting current . . . Century Electric Company designed its famous M-frame Type RS Repulsion Start Induction Brush-lifting, Single Phase Motor.

It was this motor that played such an important part in developing and stabilizing the electric refrigerator, oil burner and house pump business. It helped popularize their use because its high starting torque and low starting current met every severe service and safety requirement of these and similar hard-to-start apparatus in domestic use.

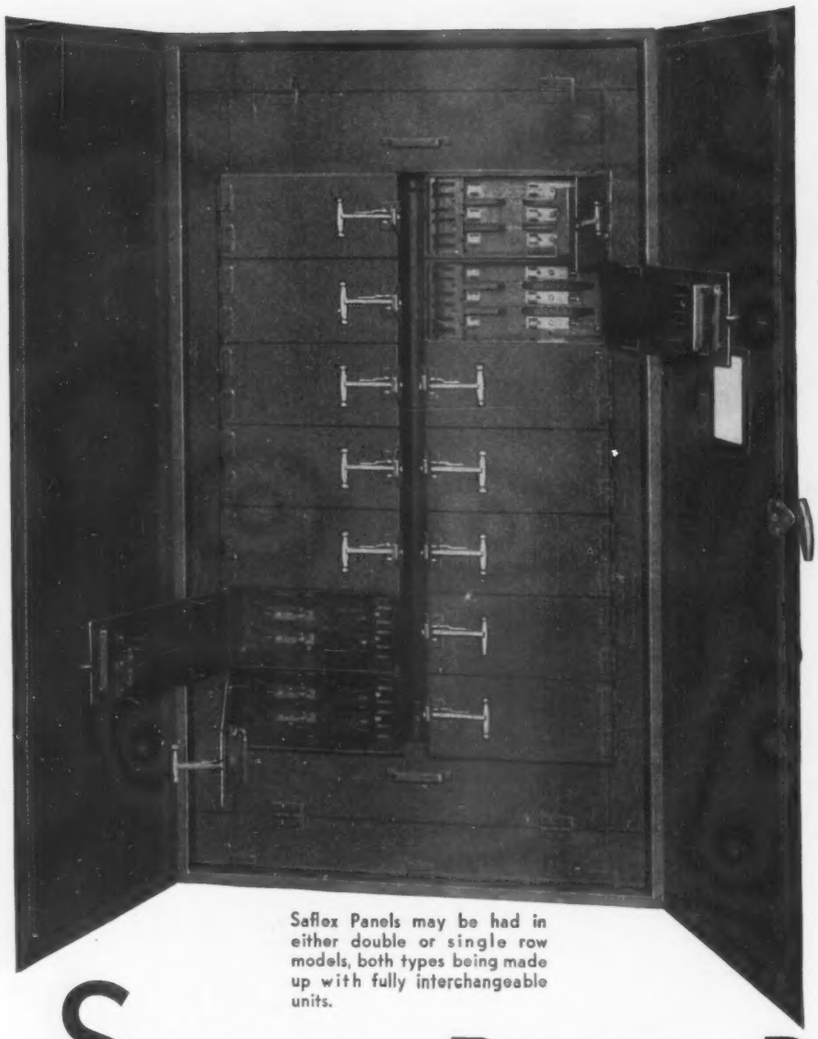
Today this motor, unchanged in fundamentals, is giving better service than ever . . . Its positive reliability has been amply demonstrated in many hundred thousands of installations in all classes of service in all parts of the world. . . . *"They Keep a-Running". . . . Ask anybody who KNOWS motors!* Century Electric Company, 1806 Pine Street, St. Louis, Mo., U. S. A.

Century MOTORS

For More Than 28 Years at St. Louis

40 U. S. and Canadian Stock Points and More Than 75 Outside Thereof

Single Phase, Three Phase and Direct Current Motors — Motor Generator Sets — Rotary Converters — Fans and Ventilators



Saflex Panels may be had in either double or single row models, both types being made up with fully interchangeable units.

20

reasons for complete panel satisfaction embodied in...

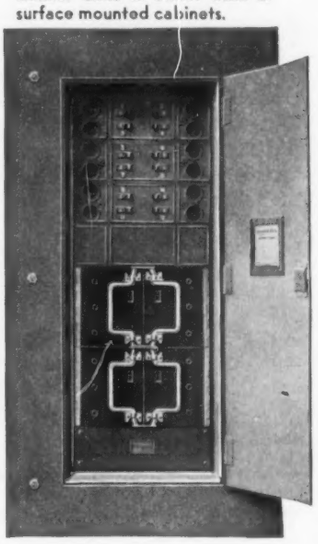
SAFLEX PANEL BOARDS

Diamond E-Square D Saflex Panel Boards embrace every proven engineering and structural feature of value to the electrical industry. They offer complete safety, no exposed live parts and circuits may be opened safely under maximum loads. All poles are broken simultaneously and there is no possibility of single phasing. Unit switches may be locked in on or off position with visible indication of switch blades at all times. Current is broken by compact and separate switch elements mounted between bus and fuse. All units are readily removable and are interchangeable in their various sizes.

Unit bases are made of ebony asbestos and all units are mounted in individual steel boxes, giving full mechanical protection. The light weight switch blade assembly is the only part carried on the steel unit door, fuses being mounted on a fixed base. Fuse jaws and clips are interchangeable within each unit without dismounting the unit. All trims and covers are hinged. Adequate provision is made for fuse ventilation and over-size wiring gutters are provided.

Write for pamphlet giving complete information.

The Saflex Junior Panel Board permits the installation of smaller units in either flush or surface mounted cabinets.



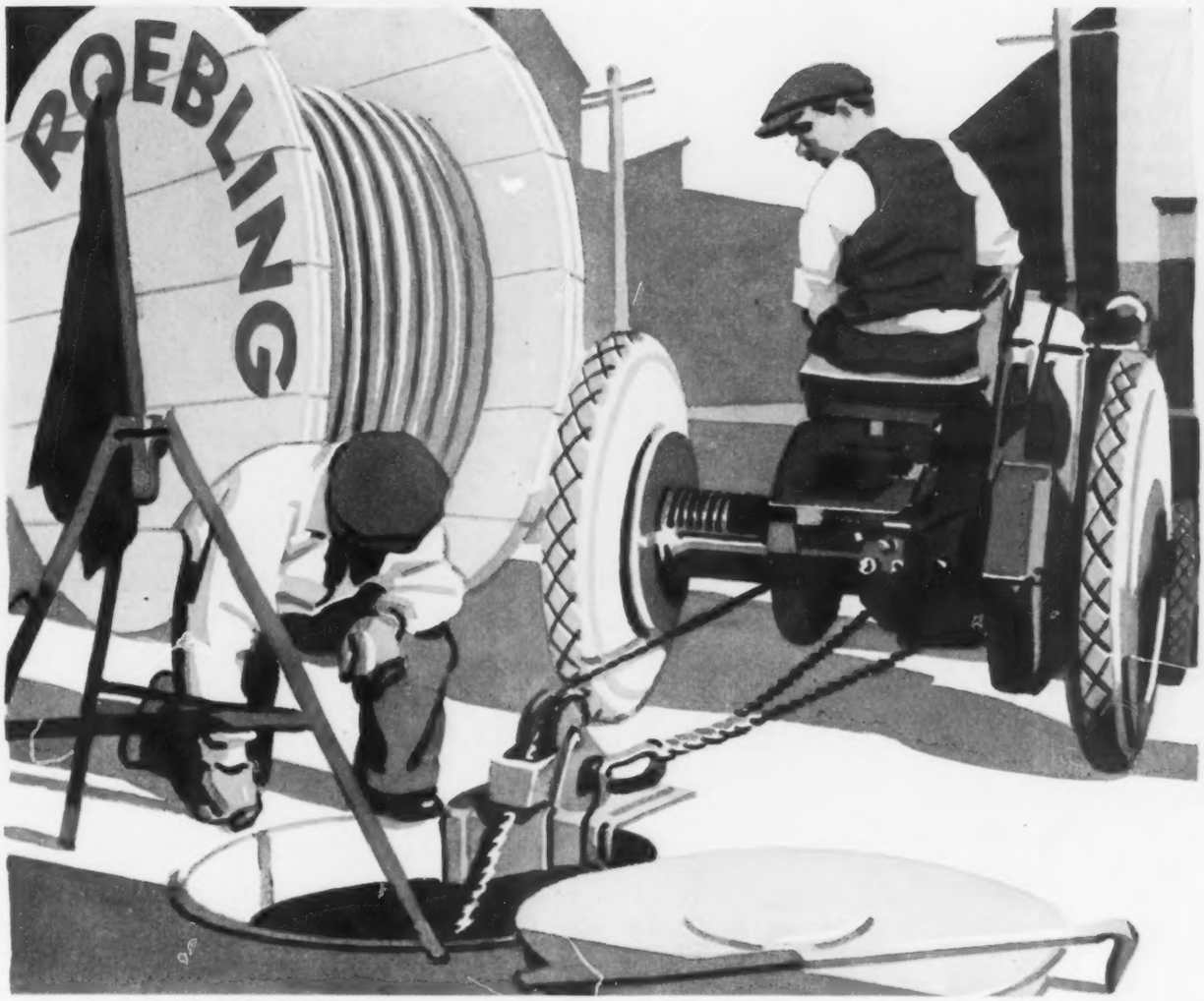
DIAMOND ELECTRICAL MANUFACTURING CO., Ltd.

SQUARE D

***AFFILIATED WITH* SQUARE D COMPANY**

1320 East 16th Street, Los Angeles, California, U. S. A.

FACTORIES: LOS ANGELES · SAN FRANCISCO · DETROIT · MILWAUKEE · HOUSTON · PERU, Ind. · WALKERVILLE, Ontario



ROEBLING

POWER CABLES for underground transmission or distribution —impregnated paper, varnished cambric or rubber insulated —can be obtained from Roebling. In fact, no matter what your wire and cable needs may be, they can be satisfied by the Roebling Line. ¶ There are over 60 types of Roebling Wires and Cables—ranging from the finest magnet wire to heavy armored submarine cable. ¶ When you need wire or cable in a hurry—sample the on-the-dot Roebling Service provided at all offices listed below. A wide variety of standard types of Roebling Wires and Cables are stocked at these points and can be shipped at once.

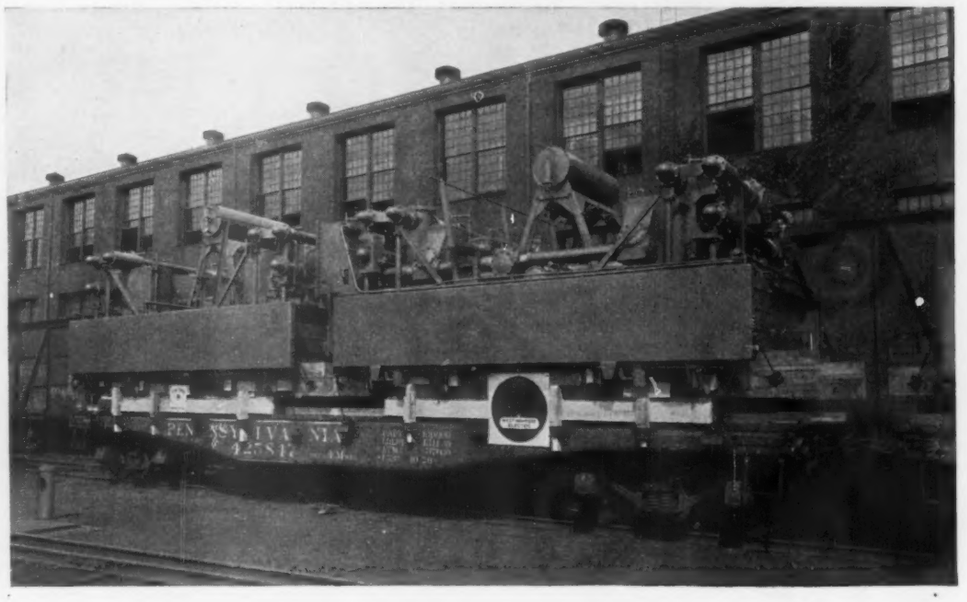
Rubber Covered Wires and Cables : Braided and Leaded : Code; Intermediate; 30% » Power Cables : Paper; Cambric; Rubber » Submarine Cables » Tree Wire » Parkway Cable » Service Cables » Station Cables » Rubber Covered Control Cables » Slow-burning Wires and Cables » Weatherproof Wires and Cables » Police-Fire Alarm Cable » Portable Cords » Annunciator Wire » And a wide variety of other wires and cables.

JOHN A. ROEBLING'S SONS COMPANY OF CALIFORNIA

San Francisco Los Angeles Seattle Portland

Export Dept., New York, N. Y.

ELECTRICAL WIRES AND CABLES



These Westinghouse Metal-clad Switchgear Bays will provide complete switching for a 33-kv. double bus outdoor substation.

Shipped Assembled

WESTINGHOUSE Metal-clad Switchgear is so designed that each bay can be shipped assembled from the factory to the point of installation. The rugged units are built with the utmost compactness and readily come within the clearance limitations of the railroads. They are filled with oil and tested before shipment, thereby assuring the correctness of the design, manufacture and assembly of the apparatus.

On arrival in the field, it is only necessary to mount the units on supporting columns, make the proper bus, cable and pipe connections, and insert the breakers.

This type of equipment is available in double bus structures for voltages as high as 34.5 kv., and interrupting capacities up to 2,500,000 kv-a.

A representative from the nearest Westinghouse office will be glad to tell you more about this modern switchgear.

Service, prompt and efficient, by a coast-to-coast chain of well-equipped shops

Westinghouse

T 31827

Butte, 52 East Broadway
El Paso, Mills Bldg.
Emeryville, 1466 Powell St.
Denver, 910 Fifteenth St.
Los Angeles, 420 South San Pedro St.
Long Beach, 1601 W. Anaheim Blvd.
Portland, 901-2-3 Porter Bldg.
Phoenix, Ariz., 412 Luhrs Bldg.
Sacramento, 1109 Ninth St.
Salt Lake City, 10 West First South St.
San Diego, 803 Sixth St.
Seattle, Lloyd Bldg., 603 Stewart St.
San Francisco, 1 Montgomery St.
Spokane, 1322-23 Old National Bank Bldg.
Tacoma, 1021 Pacific Ave.

Selected by

STANDARD OIL of NEW JERSEY

The design and construction of a Research Laboratory Building at the Bayway Refinery of the Standard Oil Company of New Jersey is one of a great variety of our current projects. These include office buildings, industrial steam stations, factories, laboratories, pipe-line work, hydro-electric and steam developments as well as reports and appraisals. Coal, oil, copper, utility, and manufacturing concerns of wide diversity are included in the list.

This broad experience is available to you for report and appraisal work and any problem of design and construction.

BUILDERS and ENGINEERS
for the
BUSINESS LEADERS *of* AMERICA

STONE & WEBSTER ENGINEERING CORPORATION

A Subsidiary of Stone & Webster, Incorporated

SEATTLE
Skinner Building

SAN FRANCISCO
Russ Building

LOS ANGELES
Edison Building

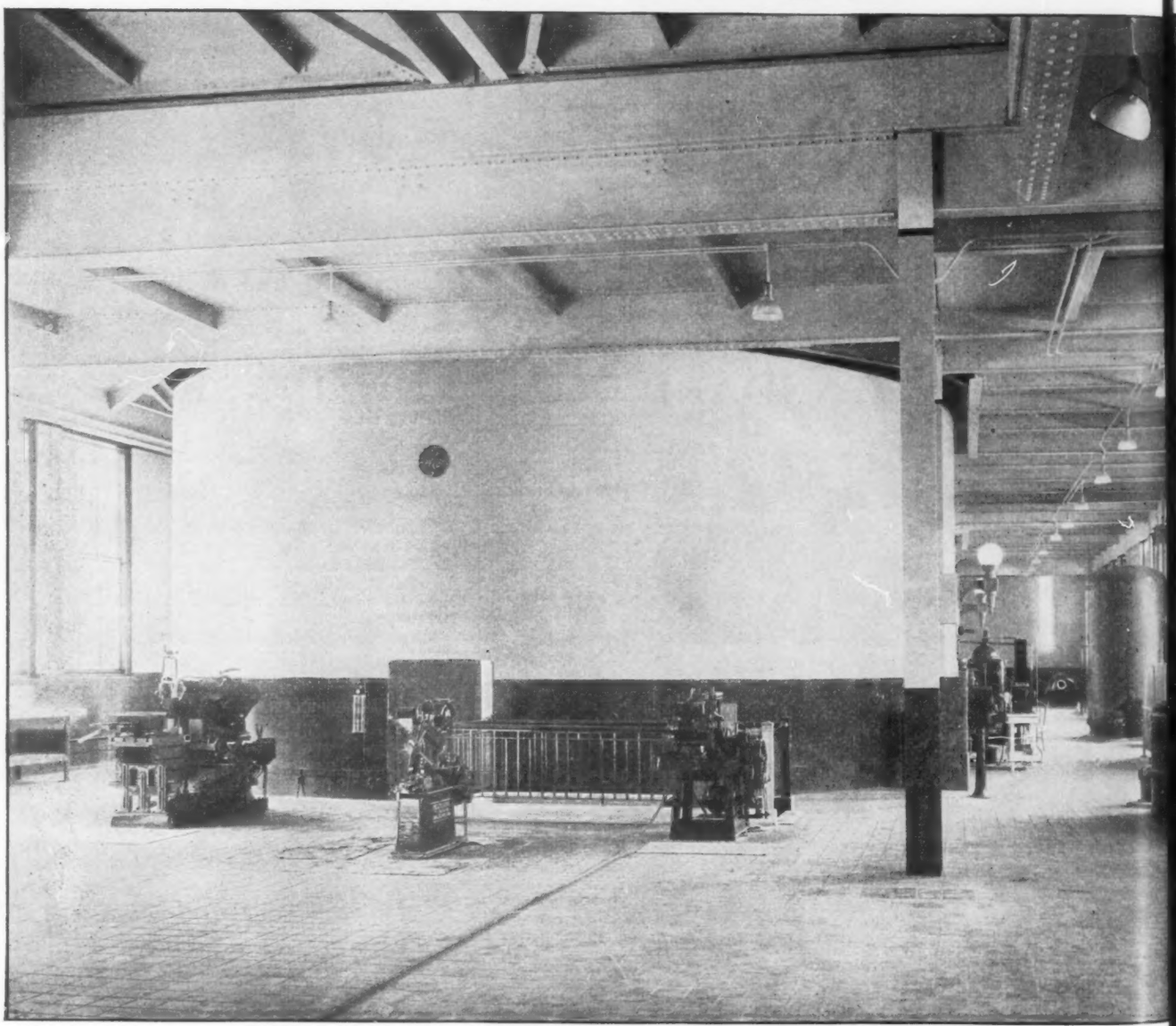
Associated in Canada with WILLIAM McCLELLAN and COMPANY, Limited, Montreal

56,250 kv-a.

THE LARGEST WATERWHEEL GENERATOR ON THE PACIFIC COAST

AT ARIEL

a New Station of the Inland Power & Light Company in Washington

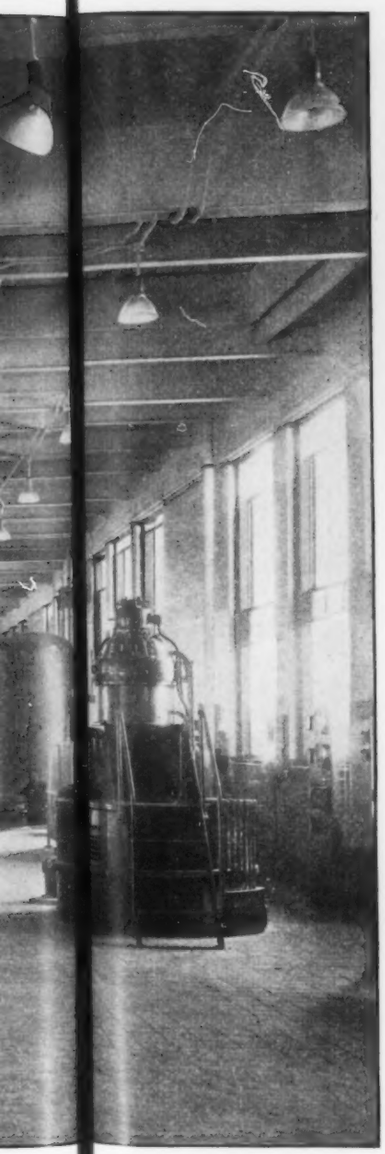


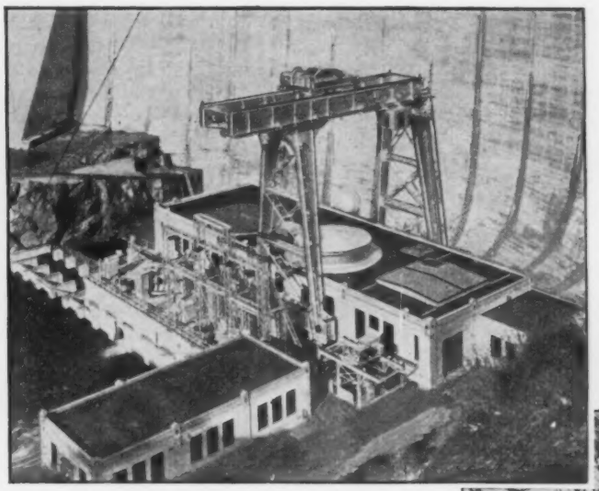
56,250-kv-a. overhung-type waterwheel generator and 1250-kv-a. station-service generator

THIS 56,250-kv-a. unit is the *largest overhung-type* waterwheel generator in service, and is exceeded in capacity only by the 65,000-kv-a generators at Niagara Falls. It is installed at the Ariel Station of the Inland Power & Light Company on the Lewis River, Washington, and will supply power for the Northwestern Electric Company, Portland and other inter-connected systems.

This generator is of completely fabricated and welded construction and is equipped with General Electric surface-type air coolers for the closed system of ventilation.

A unique feature of the station itself is its low headroom, provision having been made for handling heavy parts of the generator through a hatchway in the building roof, by means of an outside gantry crane.

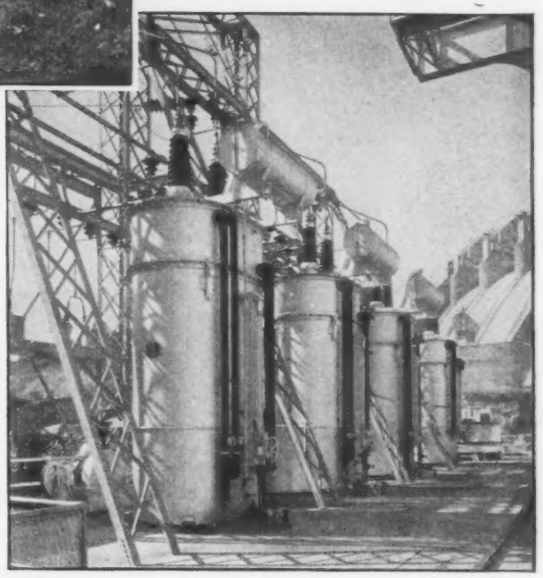




View of station with gantry crane over generator hatchway

JOIN THE "G-E CIRCLE"—SUNDAYS AT 5:30 P. M. E. S. T. ON N. B. C. NETWORK OF 54 STATIONS—WEEK-DAYS (EXCEPT SATURDAY) AT NOON

Four 18,750-kv-a., 115,000-volt power transformers



Other major G-E equipment furnished for this station:

One 1250-kv-a. waterwheel-driven generator for station service.

Four 18,750-kv-a. power transformers for transmission at 115,000 volts to the system of the Northwestern Electric Company.

Two 1250-kv-a. transformers for station service.

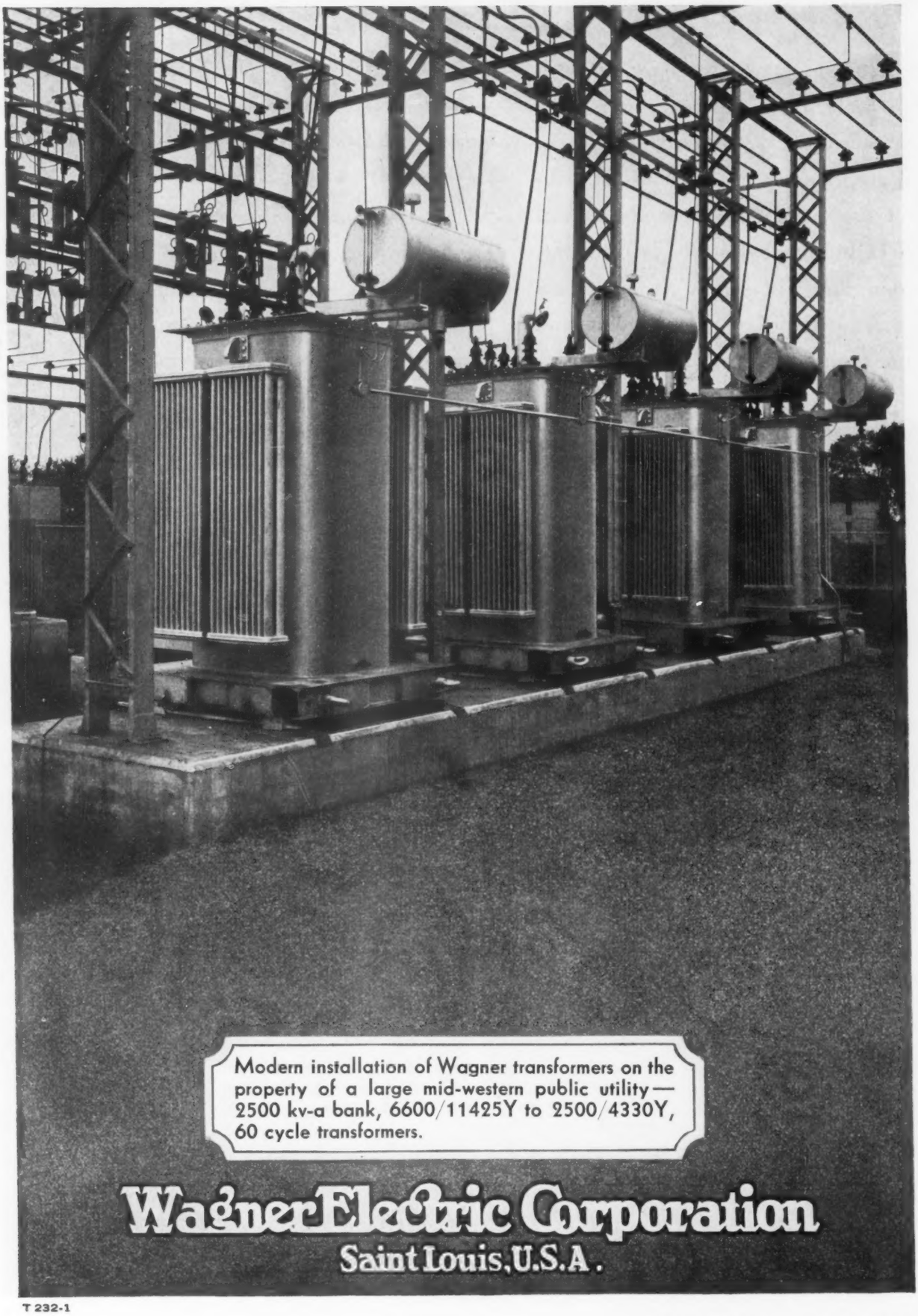
One spare motor-generator exciter set.

Control board to control the generator and exciters, outgoing transmission lines, station-service generator, spare motor-generator set, station transformers, and regulators.

100-18

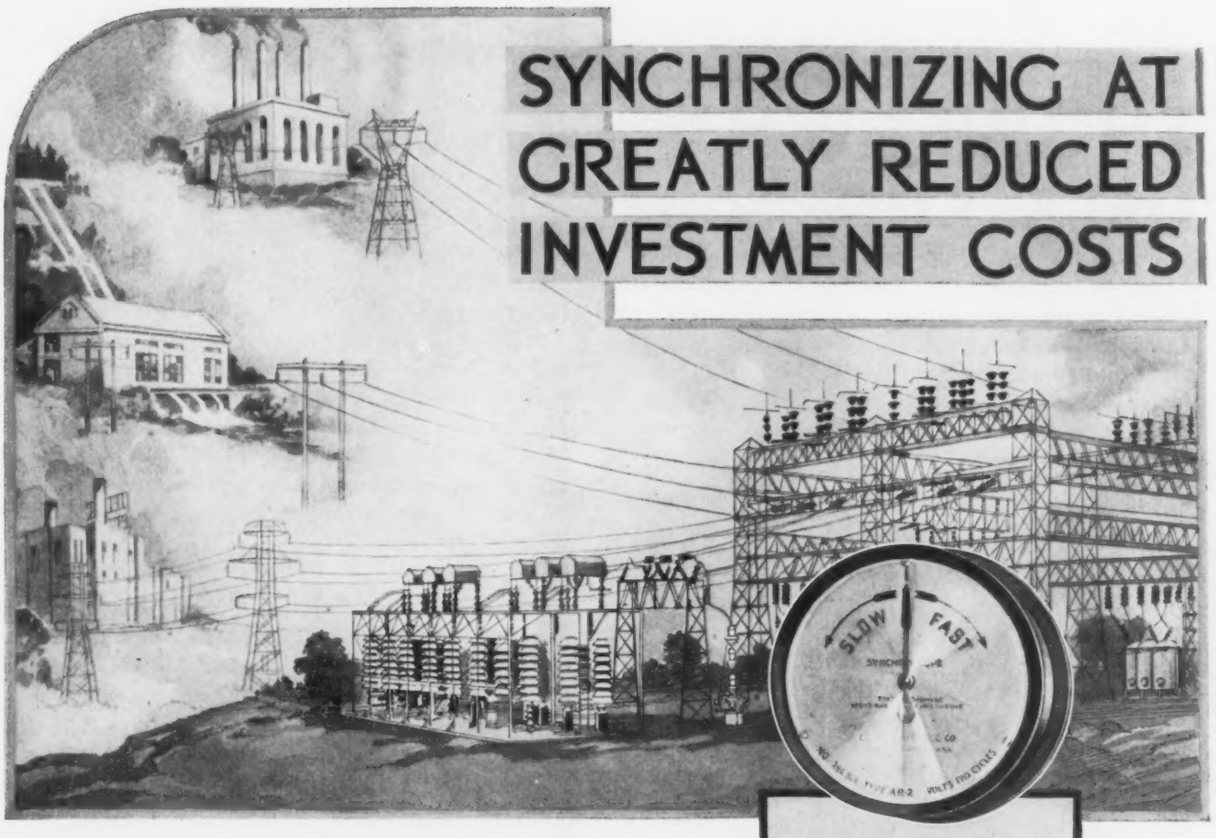
GENERAL ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES


Modern installation of Wagner transformers on the property of a large mid-western public utility— 2500 kv-a bank, 6600/11425Y to 2500/4330Y, 60 cycle transformers.
Wagner Electric Corporation
Saint Louis, U.S.A.

T 232-1

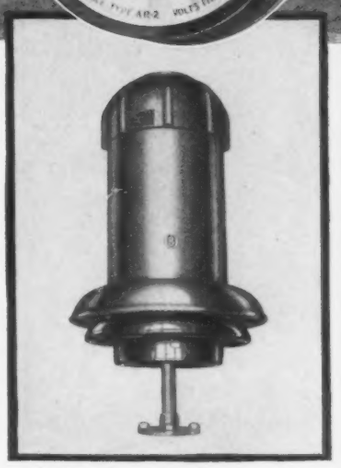
SYNCHRONIZING AT GREATLY REDUCED INVESTMENT COSTS



IN the past, synchronizing facilities at many desirable points in a transmission system have been denied due to the high cost of voltage reduction equipment. If this cost were reduced, a sound economic balance between cost and benefit would obtain; and the advantages of synchronizing at outlying points could be realized.

Today, this economic balance is secured on many properties by the use of O-B Coupling Condensers. Used as the means for voltage reduction, these condensers provide synchronizing facilities at greatly reduced investment costs; usually from 20 to 45% less than the cost of other equipment used to provide low-voltage energy. Ample power can be delivered to operate other additional instruments—especially when used in combination with the late model synchronoscopes which have low burdens.

While it is preferable to synchronize between condensers, it is equally easy to synchronize systems where energy for instrument operation is obtained by condensers on one line section and capacitance tap bushings, or either phase-to-ground, or phase-to-phase potential transformers on the other sections. Thus O-B Condensers readily adapt themselves to present equipment without changes.



Ohio Brass Condenser Unit

This assembly-design of O-B Condenser Units provides an elasticity which enables the units to withstand mechanical shocks without injury.

Specific information looking to the application of O-B Coupling Condensers to your circumstances is available from O-B District Representative or from:

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Canadian Ohio Brass Co. Limited **Niagara Falls, Ontario, Canada**

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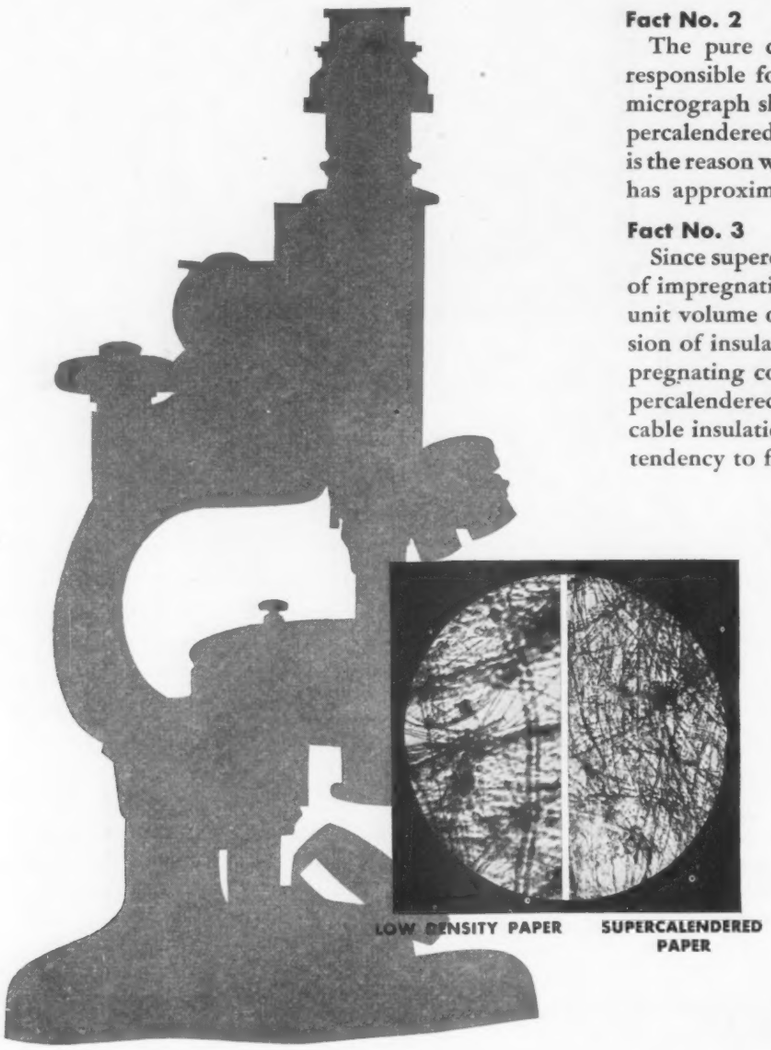
The MICROSCOPE SHOWS WHY GENERAL CABLE USES SUPERCALENDERED PAPER

IN all paper cables—Type H, Belted, Single Conductor—General Cable uses *scientifically* graded paper insulation. The inner layers—next to the conductor—are supercalendered paper. Below is a microscopic comparison that establishes facts to prove why this insulation is better.



LOW DENSITY PAPER SUPERCALENDERED PAPER

Fact No. 1

It is a well known fact that the denser the paper, that is, the more closely the pure cellulose fibres are packed together as in supercalendered paper, the greater the barrier action to the passage of ions. The photomicrograph shows the comparative density of the two papers and explains why General Cable supercalendered paper is approximately 15% stronger dielectrically.

Fact No. 2

The pure cellulose fibres in insulating paper are responsible for its mechanical strength. The photomicrograph shows more fibres per unit volume in supercalendered paper than in low density paper. This is the reason why General Cable supercalendered paper has approximately 30% greater mechanical strength.

Fact No. 3

Since supercalendered paper is more dense, the ratio of impregnating compound to paper becomes less per unit volume of insulation. As the coefficient of expansion of insulating paper is very small and that of impregnating compound relatively large, the use of supercalendered paper results in less expansion of the cable insulation with temperature, and therefore, less tendency to form ionizable voids in operation.

For further information on this improved insulation, please consult our nearest office.

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EXECUTIVE OFFICES: 420 LEXINGTON AVENUE, NEW YORK • CONSULT OUR NEAREST OFFICE

The first shipment of an Allis-Chalmers Mercury Arc Power Rectifier consisted of a 3000 k.w. unit and was made in 2½ months after the rectifier business was acquired. Six other 3000 k.w. rectifier plants are nearing completion.

The Mercury Arc Power Rectifier

business, which was taken over when Allis-Chalmers purchased the principal assets of the American Brown Boveri Co., Inc., of Camden, N. J., has been readily absorbed into the Allis-Chalmers shops at Milwaukee. The key men of the engineering and shop organization from Camden are now fully established at the Milwaukee plant, and the manufacture of Rectifier plants for current orders is in full swing.

Allis-Chalmers Mercury Arc Power Rectifiers are built according to the designs and experience of Brown Boveri & Co., Ltd., and are backed by the organization and resources of Allis-Chalmers.

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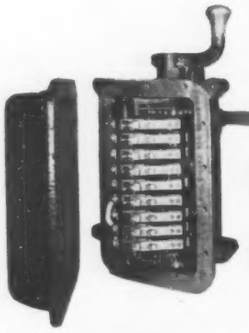

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A totally enclosed rheostat, providing smooth acceleration and accurate control of a high speed laboratory centrifuge. A low voltage protection relay is incorporated insuring starting with entire value of resistance in circuit.

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Many features not found in any catalogued control are incorporated in these units of control.

Years of experience with special electric control to meet the demands of many industries is an advantage worth your consideration.

Tell us about your particular problem. We'll be glad to offer our suggestions and cooperate in its solution.

Motor generator controller for Anti-Aircraft Range Finding Calculation Board.

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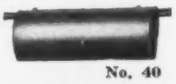
No. 80

No. 80—Unwired unit, length, 8½ inches; drawn of brass, rigid porcelain socket. Standard finish, statuary bronze plated for T-6½ tubular lamp.



No. 40

No. 40—Exterior refrigerator case reflector 8 inches long, drawn of one piece heavy gauge brass, reflecting surface, steel porcelain enameled, for one standard base T-10 tubular lamp.

No. 2600

No. 2600—Thin model size for clear plate glass; outer frame, drawn bronze moulding; porcelain socket, intermediate base for T-6½ lamp. Any standard finish.

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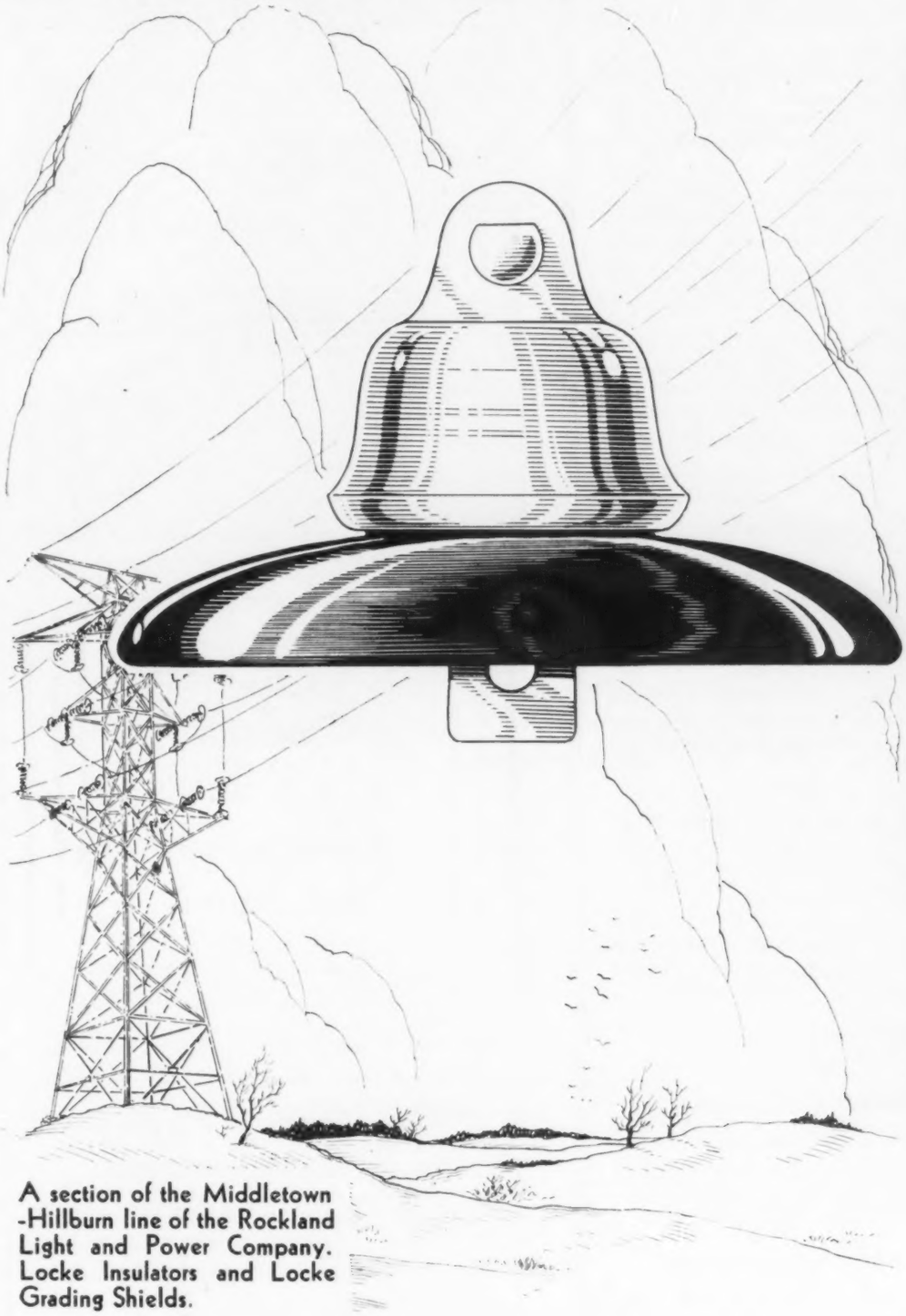

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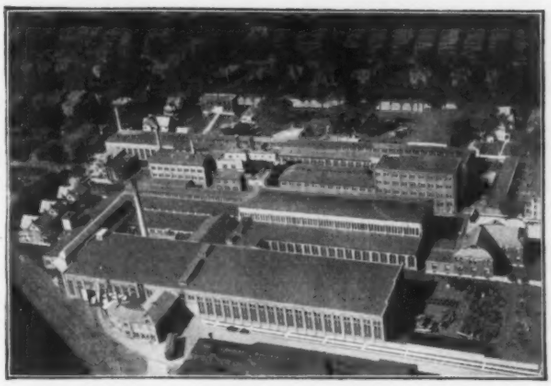

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Colorful pages in 9 leading magazines carry the NEW story of Westinghouse . . . striking, sensational newspaper advertising (signed by you, cost shared by Westinghouse) is ready to present Westinghouse Dual-automatic to your city . . . Complete sales helps — from direct-mail campaigns to startling window displays — are available. Every possible merchandising assistance and counsel is yours . . . to help you sell Westinghouse, *at a profit.*

Write, wire, or phone for full particulars about the most sensational refrigerator news in years.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
Mansfield, Ohio

The Westinghouse line is complete, from small apartment models to the largest and most luxurious types. All are Dual-automatic.

Westinghouse

Westinghouse provides the world's most beautiful Water Cooler line. Dual-automatic, striking design. Black Micarta cabinets, Chromium trim.

Model CMB-4 is a portable bottle cooler with refrigerated compartment for bottled beverages under lock and key. Without compartment, Model MB-5.

Model MT-3, pressure cooler for water line, with bubbler and self-closing faucet. Also Model CMT-4, with refrigerated compartment.

Forward PCEA
---we will keep pace!

1932

We Have Kept Our Pledge!

During the past year, your Bureau has achieved noteworthy progress in inter-industry cooperation. There has been a better organization of committees, more intensive preparation for educational drives, better harmony between the branches of the industry!

The work of the various committees can be measured in definite results that will prove of value to all of us. Some of the outstanding achievements of the committees include:

—a substantial increase in the number of Red Seal Homes in ratio to new homes built.

—excellent work in connection with unifying municipal ordinances throughout the state.

—a specific drive on domestic, industrial and commercial lighting, by means of direct-mail campaigns, window displays, lectures.

—organization of courses in appliance merchandising as a background to more complete electrification of the home.

—an extensive survey embracing the use of electricity in the oil industry.

—a series of mailing pieces on industrial lighting, augmented by inspection tours of modernly electrified industrial plants.

—co-ordination of agricultural committee activities started early in the year, supplemented by field tests for the increased use of electricity on the farm.

Now—every one of us behind the Bureau's badge of achievement to make 1932 a year of even greater progress!

Pacific Coast

ELECTRICAL BUREAU

A non-profit organization supported by all branches of the industry as an advisory bureau to serve impartially all users of electricity

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Los Angeles

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Fresno